Vol. XXV MARCH 1931 No. 3

The EXCAVATING ENGINEER

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Taming "Old Man River" - - Yesterday and Today

Selling Concrete at Your Door

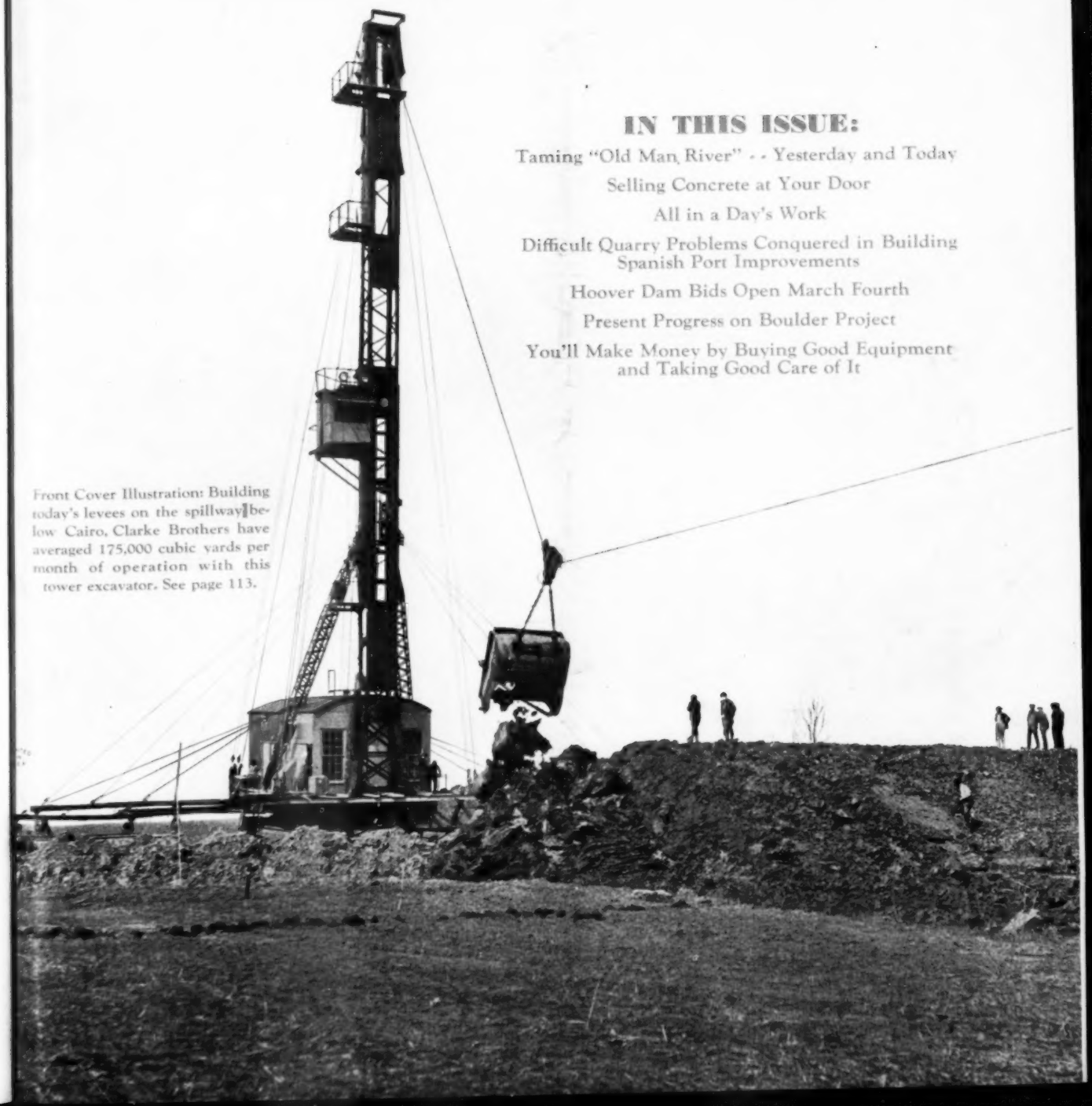
All in a Day's Work

Difficult Quarry Problems Conquered in Building Spanish Port Improvements

Hoover Dam Bids Open March Fourth

Present Progress on Boulder Project

You'll Make Money by Buying Good Equipment and Taking Good Care of It



Front Cover Illustration: Building today's levees on the spillway below Cairo, Clarke Brothers have averaged 175,000 cubic yards per month of operation with this tower excavator. See page 113.

1/2-
yard
5/8
3/4
7/8
1
1-1/4
1-1/2
-3/4
2
2-1/4
2-1/2
3
3-1/2
4
4-1/2
and
up to
16
yards

ovels
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lines
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ifting
ranes
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ranes
unnel
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edges
Drag-
line
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Gaso-
line
Diesel
Gas
+
Air
lectric
Steam
Diesel-
Electric

Profits *where the dirt is* Thin!

On those shallow grading jobs where the pay dirt is spread out thin—there is where you will appreciate a Bucyrus-Erie!

This Bucyrus-Erie gasoline shovel is leaving a floor practically ready to lay the slab. Its big, sure-acting clutches and brakes give the operator a "feel" that enables him to split an inch where he wants to and still maintain a high rate of output all day long. ***Send for catalog on any size.***

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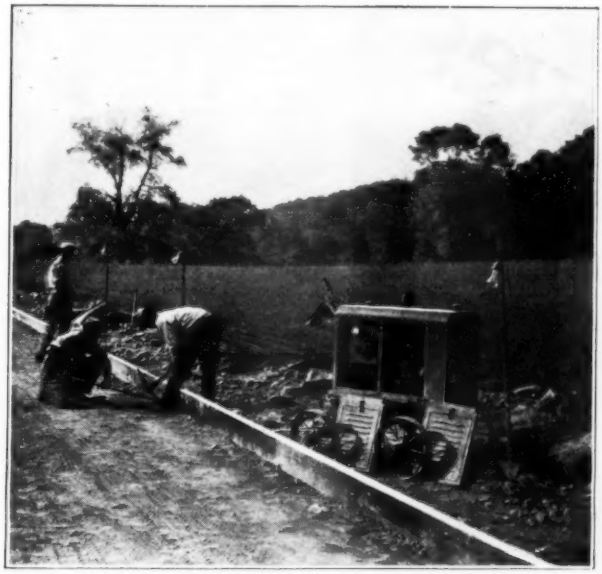

Novo Flud-Lite Unit furnishing light for 9 miles of night subgrading

Lick night and you lick the worst enemy standing in your way as you rush a job to completion.

You can lick night easily, quickly, surely and cheaply. You can have a big slice of daylight all night long for operating cranes, shovels, draglines, pavers and other construction equipment—or for lighting construction, camps, tunnels, excavations, bridges, dredges and docks.

The outfit is simple, compact and easily moved. The standard Novo Timken Roller Bearing equipped engine is direct connected to a standard generator. Light is flickerless and steady. Voltage is held constant within close limits. And one gallon of gasoline will generate 1000 watts for eight hours.

In addition, Novo Flud-Lite Units can be used to generate electricity for powering small electrical tools such as concrete surfacers, electric hammers, hand saws, portable link saws, tie tampers and other equipment having a ⅛ to ½ h. p. motor. Write for complete details.

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Flud-Lite Lighting Units

The Excavating Engineer

About Excavating Projects—By Excavating Men—For Excavating Men—The World Over

25 Cents Per Copy — One Dollar Per Year

Vol. 25 MARCH 1931 No. 3

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OVER 75,000 ATHEY TRUSS WHEELS HAVE SEEN SERVICE UNDER ALL CONCEIVABLE CONDITIONS

ATHEYS owe their remarkable ability to haul heavy loads under all operating conditions, to REFINED STRENGTH—not plain weight—and to the unmatched construction and sound engineering principles that are available only in ATHEY TRUSS WHEELS.

That's why ATHEYS carry greater pay loads with less tractive power—why their light-running qualities allow tractors to operate at top speeds under all soil conditions and save materially on operating and maintenance costs—why their length of life is unequalled—why cost per yard of pay dirt is the lowest possible! Athey 3-ways, Rear Dumps and Hopper Type Rear Dump Trailers assure the right unit for every job. Write today for complete information.

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130 N. Wells St., Chicago, U. S. A.
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The Baldwin Locomotive Works, Foreign Representatives
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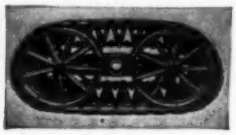
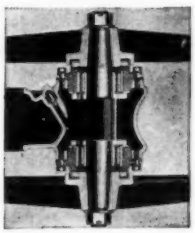
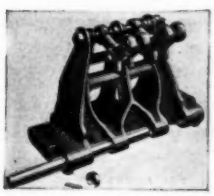
Athey
TRUSS WHEEL EQUIPMENT



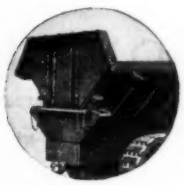
The Athey Truss Wheel is a self-cleaning, track-laying wheel that operates under all soil conditions. Its simple construction provides an extremely light-running wheel, having the greatest possible structural strength.



Athey's bearing seal is 100% effective. Sand, grit, abrasive materials are positively excluded by Athey's triple seal, eliminating one of the greatest and most common causes of bearing failure.



Athey's track is equipped with Trip Chains so it can actually be re-built three or four times restoring the original arch and light-running qualities, reducing track maintenance costs 75%.



Special high carbon, heat treated frame, scientifically reinforced with Truss Rods and Plate, has double the strength of an ordinary structural frame. U-shaped cross members, rigidly bolted to frame, eliminate chassis twisting.

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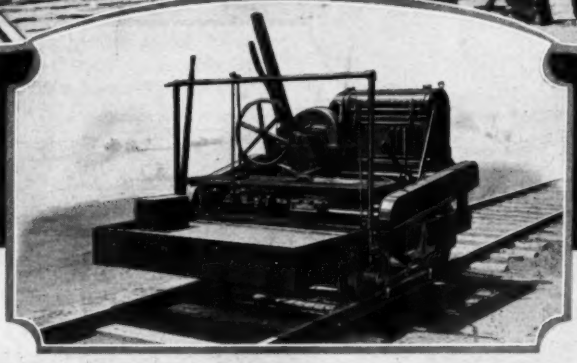
How Do You Shift and Raise Track?



One man with machine or 14 men with bars

The same job and the same kind of work. Here again is shown the labor and time saving possibilities of the Nordberg Track Machine. This big railroad yard construction job required the shifting of a great amount of track, which was done entirely by the machine. Until the shifting work had been completed, the aligning of track was done by hand and required the services of 14 men. When the machine was later available for aligning, it replaced these men and did the job in less time.

This is but one of the many applications of this unusual machine. For shifting track, or for raising work on elevations, fills, etc., it eliminates the major portion of the track gang ordinarily required where hand methods are employed.

Write us about your track raising and shifting problems, whether for standard or narrow gauge track. Bulletin GR-8 describes this machine.

Nordberg Mfg. Co., Milwaukee

THE NORDBERG PATENTED TRACK MACHINE

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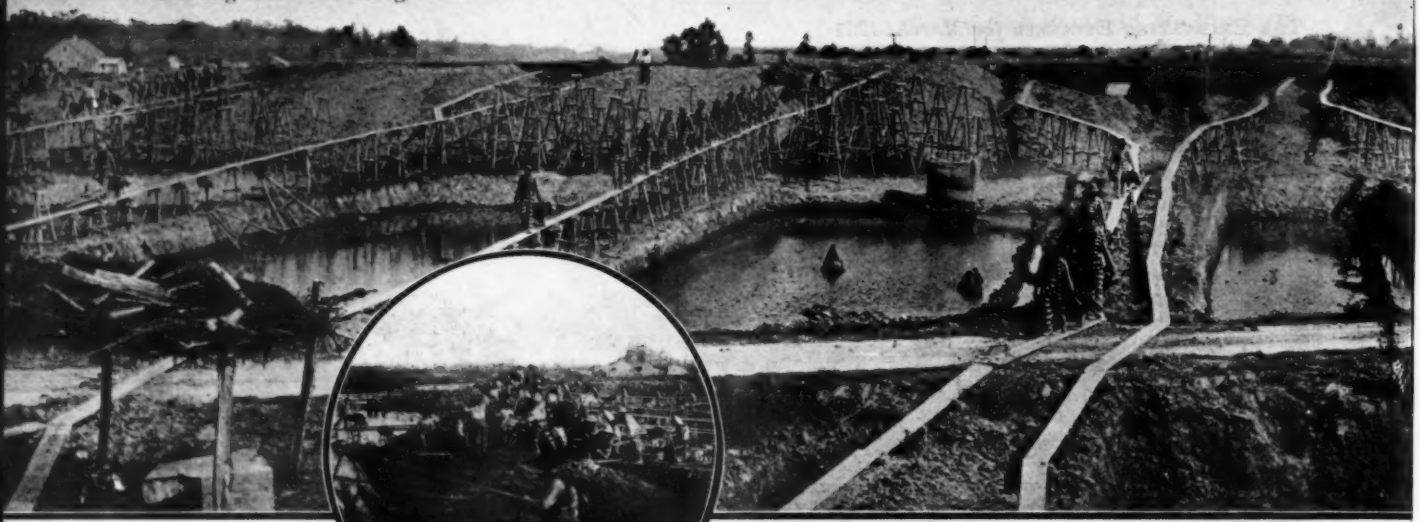
Building levees with negro convict labor—about 1900.

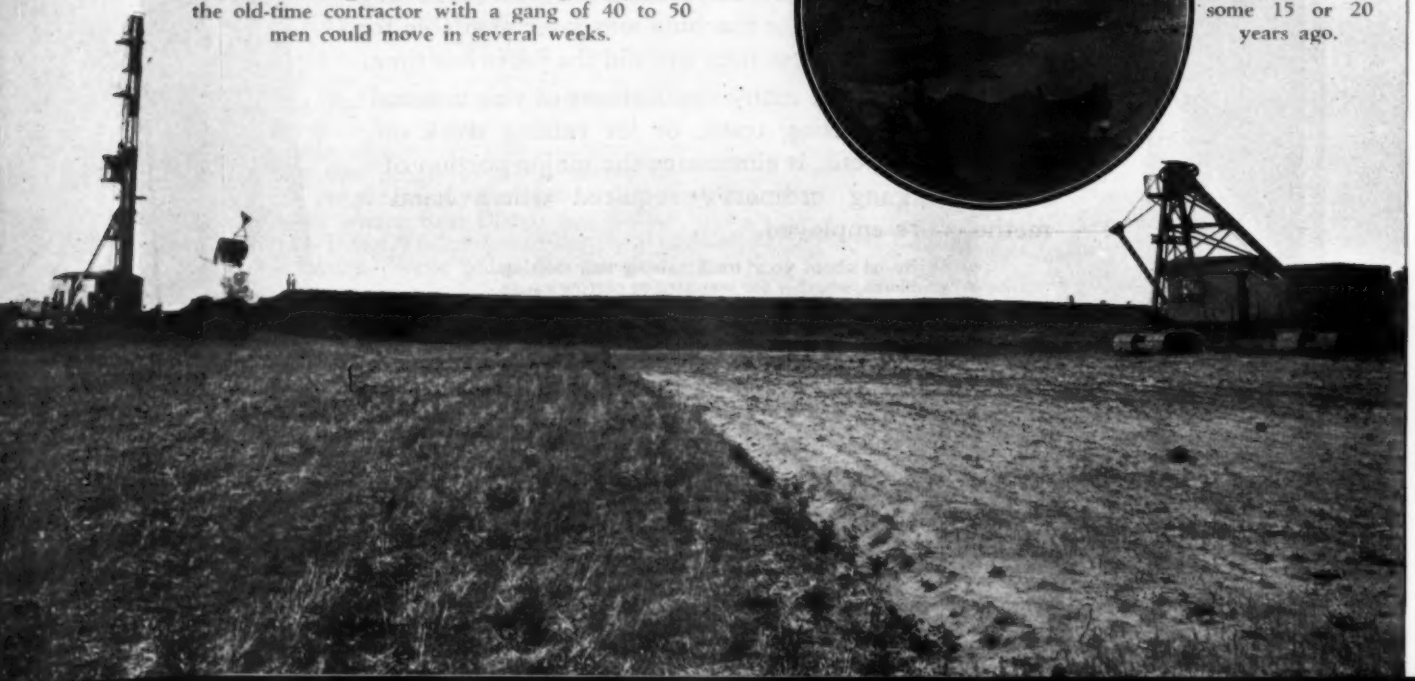


The "Irish" repair a crevasse — probably about 1910.

Circle: From an old album comes this age-stained picture showing negro convicts building levees. Borrow pits were permitted on both sides of the embankments. Probably about 1880-1890.

Today the levee builder uses modern machine methods moving more dirt in a single day than the old-time contractor with a gang of 40 to 50 men could move in several weeks.

Circle: Wheelers on "The river" some 15 or 20 years ago.



The EXCAVATING ENGINEER

Vol. XXV MARCH 1931 No. 3

Today — ten yards every 72 seconds.

Taming "Old Man River"-- Yesterday and Today

Including description of work by Clarke Brothers with Tower Excavator on Birds Point — New Madrid Spillway

THE PROBLEM of controlling the flood waters of the Mississippi has been worked on continuously since the French colonists under d'Iberville looked upon the richness of this river valley in 1699. Prior to 1803 it was the French and Spanish engineers who directed their efforts toward protecting the fertile sugar and cotton fields of Louisiana against the destruction of periodical high waters. Considering the very limited means at their disposal they accomplished wonderful results in their battle with the river. It was an annual contest in which the engineers and levee builders were generally successful. To be sure the channels of the great river were narrower and deeper in those days and the volume of flood water insignificant compared with that of today. The great "Father of Waters" had not built the stream bed quite so high above the surrounding countryside through its long delta which extends far up stream to Cape Girardeau, Missouri. Nevertheless these pioneers succeeded well in what they attempted and laid the foundations for the levee system which is being

Looking back over the finished levee from the operator's station on the head tower.

EDITOR'S NOTE: We acknowledge the courtesy of Major W. H. Holcombe and Senior Superintendent William T. Newton, U. S. Engineers Office, New Orleans; Major P. S. Reinecke and Major D. O. Elliott, U. S. Engineers Office, Vicksburg; Illinois Central Railroad; *Scribner's Monthly* July 1881; *Biographical and Historical Memoirs of Louisiana* Vol. 2, Published 1892, as well as that of T. J. Clarke and M. J. Clarke of Clarke Brothers in furnishing cordial co-operation, information and illustrations used in the preparation of this article.

In commenting on levee building methods at the close of the nineteenth century one of our correspondents comments:

"Wheel barrows and convicts built the levees on the Mississippi 30 years ago. When a nigger fell off of the runway only the wheel barrow was salvaged. The rest was material in place. The rule as to foreign matter in the levee did not apply as most of the negroes were natives.

"Fifteen yards per day per man was not an uncommon output and prices ranged from 20 cents to 40 cents per yard."

rushed to completion today.

The written history of the construction of the levee system on the Mississippi begins in 1727. On November 15th of that year a levee 5,400 feet in length and 18 feet in width at the crest was completed along the water front at New Orleans under orders of Governor Perier. Later this was extended to a length of 18 miles.

In 1728 the colonists who had settled along the river for 30 miles above New Orleans were driven to protect their lands from overflow and each planter constructed a levee in front of his lands. Within the next seven years the levee system extended from a point 30 miles above the English turn to a point 12 miles below. After the high water of 1735 an edict was issued in Louisiana threatening confiscation of all lands whose owners neglected to have their levees in good condition by January 1, 1744. This was the real beginning of the great levee system of today.

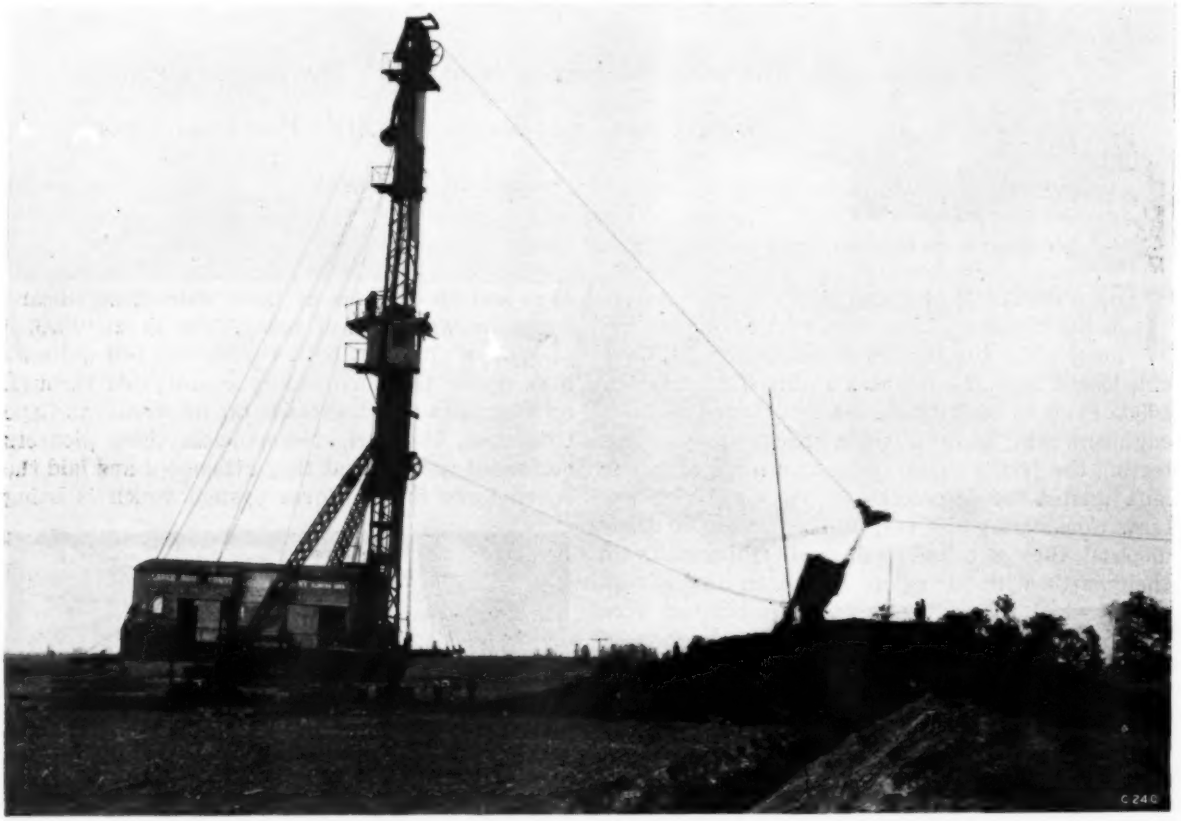
When Louisiana became a territory of the United States in 1803 the levees extended from the southern most plantation below New Orleans to Pointe Coupee on one side and to a point near Baton Rouge on the other, while above the mouth of the Red River to the mouth of the Arkansas the villages were protected by strong embankments.

In 1849-1840 the Federal Government took a hand and appropriated swamp lands along the river to be sold and the proceeds devoted to levee construction. In 1860 the levee system embraced approximately 2000 miles of embankment most of it from 8 to 10 feet high, about 8 feet wide on the crest and 50 to 75 feet wide at the base.

How the Early Levees Were Built

In the days when the levees were built by the individual planters the generally accepted method was to throw up a mound of dirt sloping from the surface at an angle of about 45 degrees to a line a foot or two above high water mark as indicated by traces left on trees, fences and shrubbery.

The embankment was usually made by casting with a spade from each side so that, when finished, an irregular trench about two spades deep, bordered each toe of the levee. These old levees were built on the natural earth; stumps and even logs were left in the embankment, and no effort was made to establish a bond to hold it in its proper place on the natural surface of the ground.



Here we get an excellent opportunity to see how today's levees are built. In the foreground may be seen exploration and key trench which with the cleared and plowed earth on which the embankment is built permits a firm bond with the natural surface. The levee itself is being piled in by the huge 10-yard bucket of the tower excavator. The top of the tower is about 130 feet above the ground, the operators house stands 60 feet above the ground. Note the device for moving the track sections, two of which are hanging from the monorail waiting to be dropped into position.

Muck and mire is the levee builders daily diet but nobody gets his feet wet with this 10-yard Bucyrus-Erie scoop carrying the material direct from borrow to embankment.

Later came an improved type of levee for which the ground was first carefully cleared off, trees, stumps, logs, weeds, and even grass and leaves being removed. Then a "key way" or "muck ditch" was dug along the center line 3 feet wide and 3 feet deep. The borrow pit was located on the river side only and a berm of 20 feet left next to the levee. Height was usually established at 3 feet above the high water marks and the top was as broad as the levee was high. The total base line was set at five, six or seven times the heighth, depending on the material. A seep water ditch was dug thirty or forty feet from the landward side of the levee with drainage connection to carry off seepage water at flood time.

The Coming of the Irish

Originally the levees were generally built by the plantation negro labor. Spades and wheel barrows were the tools used. Later the negroes, not particularly efficient with this hand shovel work, were largely displaced by the "Invasion of the Irish". Laborers, chiefly Irish with a few English, Scotch, Germans and Scandinavians, were collected in October by the levee contractors at St. Louis, Cincinnati or Cairo and shipped to the section where contracts had been signed. They worked through the season until high water—then the swamp knew the Irish no more until fall. Levees were paid for then as now, by the cubic yard, usual prices being 25 to 35 cents per yard, paid in cash or levee bonds. In those days (about 1881) a good seven foot levee with ample base cost from $8,000 to $11,000 per mile.

After the hand-shovel and wheel barrow came dump wagons and mules, elevating graders, small draglines, large draglines, and the tower excavator. In fact, all of these tools are being used by the levee builder of today.

And the levee system that started with a few thousand feet at New Orleans in 1727 has grown to a great system thousands of miles in length walling in "old man river" with strong banks of earth from the Gulf to Cairo and also reaching out to chain the more dangerous tributary streams of the Mississippi Valley.

In *July 1930* and *January 1931* we described levee building with large draglines. There follows a story of levee building with the Bucyrus-Erie tower excavator operated by Clarke Brothers of Clinton, Iowa.

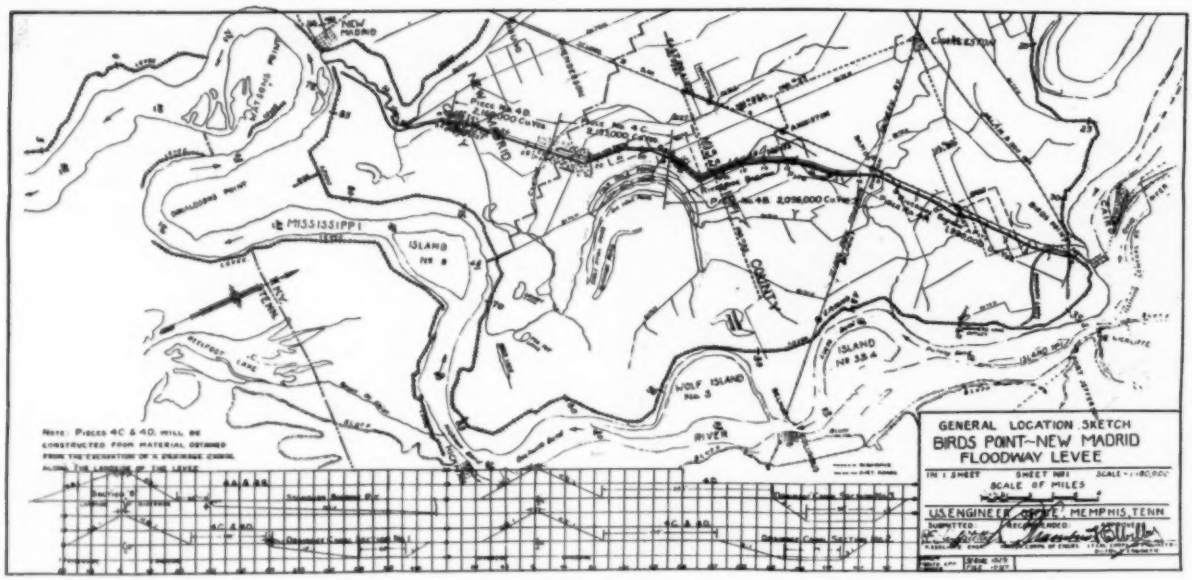
Clarke Brothers Specialists in Levee and Drainage Work

It was in 1908 that T. J. Clarke and M. J. Clarke formed a co-partnership at Clinton, Iowa under the name of Clarke Brothers for the purpose of handling drainage and levee construction work. "T. J." looks after the construction and field end of the work while "M. J." takes care of the "inside" end.

Among the large jobs they have handled since 1925 are included 4,000,000 cubic yards for the St. Francis Drainage District, Piggott, Arkansas; 1,500,000 cubic yards for the Tironza Drainage District at Blytheville, Arkansas; 1,500,000 cubic yards for the Little River Drainage District, Lilbourn, Missouri and 1,000,000 cubic yards for the St. James Drainage District, Mississippi County, Missouri.

All of this work was handled with two Bucyrus-

The tail tower a bit over 30 feet in height moves on caterpillar type mountings. Besides supporting the end of the track cable, it carries a storage reel to take up the track cable when operating on a short span.



Clarke Brothers' section is indicated by red shading.

Erie Class 14 Diesel-electric draglines and two Bucyrus-Erie Class 7 gasoline draglines.

2,056,000 Cubic Yards in Present Levee Contract

On May 22nd, 1929 they were let 2,056,000 cubic yards of levee building on Section 4-B of the Birds Point—New Madrid spillway through the U. S. Engineers Office at Memphis. This 8½ miles of levee averaging 16.5 feet in height is located about 20 miles below Cairo. Its purpose as outlined in General Jadwin's plan is to enclose a flood basin with emergency levees set five miles back from the bank levees. In normal high water the bank levees will confine the river to its natural bank, but in times of extreme high water these bank levees will be opened to permit the river to overflow into the area of the Birds Point—New Madrid spillway thus relieving the pressure down stream and preventing the flood waters backing up over Cairo.

Preliminary work of clearing, stumping and digging the four by six foot muck ditch (or inspection ditch, as it is now called) is handled by one of Clarke Brothers' Class 7 draglines, powered by a Twin City gasoline engine—a veteran of 12 years service.

The levee itself is built with a Bucyrus-Erie electric-powered tower excavator. Power is supplied from Clarke Brothers own power plant equipped with two 400 horsepower Busch Sulzer Diesel engines.

How the Tower Excavator Operates

The steel tower excavator, originated by Bucyrus-Erie in 1915, has been eminently successful in securing low unit costs on levee building and a large number of them are in service on the Mississippi River, and its branches as well as on the *Beauharnois Canal. The machine consists of two movable towers, a high head and a lower tail tower between which runs a slackline cableway or track carrying a scraper bucket.† The head tower oper-

(Continued on Page 150)

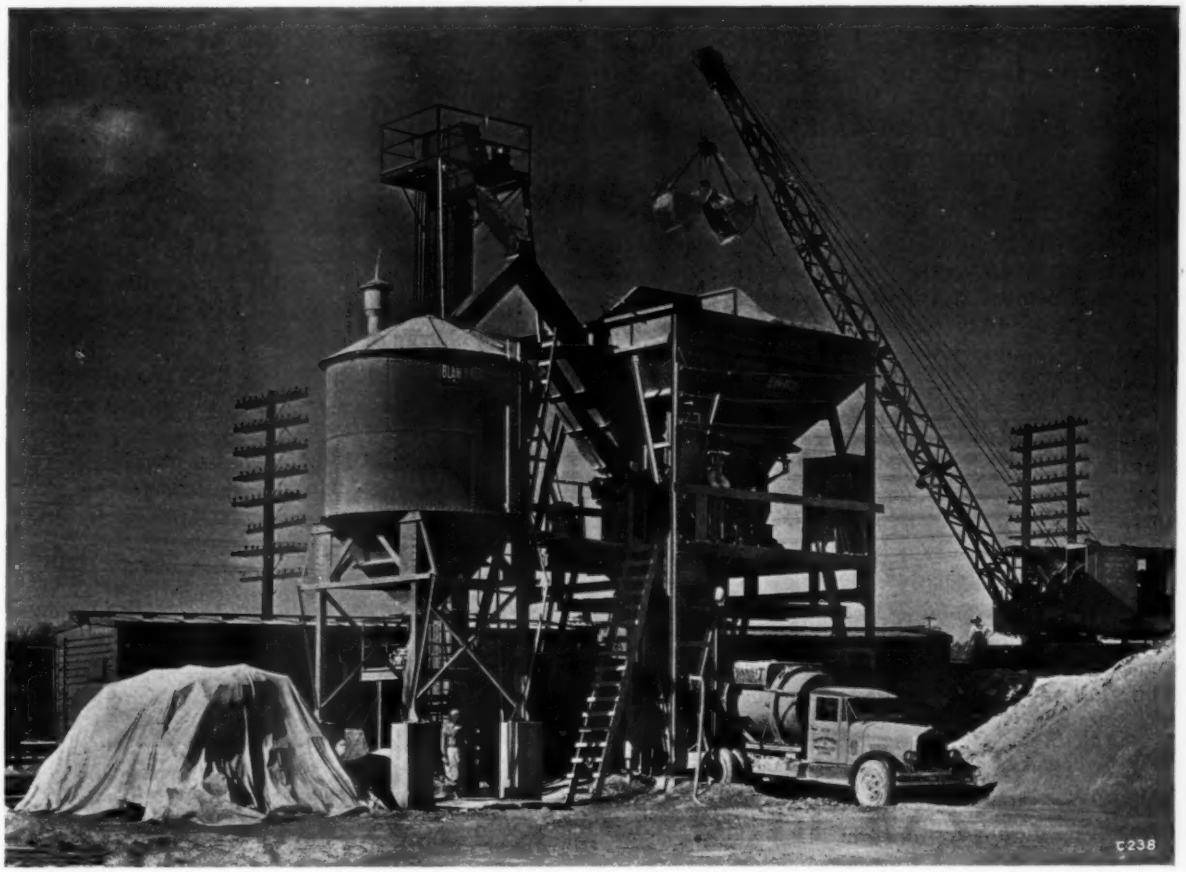
Track sections are lifted with Yale & Towne chain hoists and carried around the machine to position for the next move, on trolleys running on an I-beam attached to the machine. Two ground men handle the moves.

*See article August, 1930 Excavating Engineer.

† Both towers are independently operated. The operator on the head tower controls the digging operations of the machine and is located in an elevated position on the tower so that he has an unobstructed view of the front of the levee and can watch the bucket throughout its entire travel whether digging, dumping or returning to the pit.

The principal duty of the operator on the tail tower is to operate the propelling machinery with which the tail tower is moved with respect to the head tower and to suit pit conditions.

In operation, the bucket is dragged in through the borrow pit by means of the drag rope which, on its way from the drum to the bucket, passes over a sheave mounted in the frame of the head tower a little below the height of the operator's position. During the digging operation the track cable upon which the bucket trolley runs, and which loads from the top of the head tower to the top of the tail tower, is slacked off by manipulation of the track cable drum which is part of the head tower machinery. When the filled bucket has reached the point where it is to be dumped, the operator takes up the slack in the track cable thereby lifting the rear end of the bucket and dumping its contents. This operation can be very definitely controlled and the placement of the material accurately spotted. When the bucket must travel far in order to get its material, tightening of the track cable may not produce a sufficiently steep angle of rope lead from the top of the head tower to cause the bucket to run out to the beginning of its digging stroke by gravity, in such cases, and if desired otherwise too, a backhaul cable is used. This cable comes from its own drum on the head tower, leads over a sheave at the top of the head tower, passes over to the top of the tail tower and then leads to the back of the bucket. The bucket is, therefore, manipulated vertically by means of the track cable, is drawn toward the head tower by the drag cable and is pulled back into the pit by the backhaul cable.



In the Tucker yard at Fort Worth.

Selling Concrete at Your Door

Tucker Concrete and Material Company supply Fort Worth and vicinity with Transit-Mix Concrete delivering as much as 600 yards per day

FOR MANY a job the installing of mixers and raw materials plant for the concrete work is expensive, inconvenient and involves congestion of much needed working areas. In Fort Worth, Texas the Tucker Concrete and Material Company eliminate these difficulties for the contractor by delivering Transit-Mix concrete at the job ready to pour into place.

The Tucker concrete has been accepted and approved by the city of Forth Worth, Tarrant County, Texas and Pacific Railway Company and numerous architects and engineers in their territory. Contractors are quoted delivered prices on the specified concrete desired and are, therefore, able to determine exactly their concrete cost, besides being assured of accurately mixed concrete that is more than meeting the required tests. The elimination of mixing equipment on the job, the saving in labor, the elimination of waste aggregate et cetera, together with the assurance of perfectly proportioned concrete at a definite delivered price is resulting in an increasing demand.

Bellows-Maclay Construction Company used 24,000 cubic yards of Tucker Transit-Mix Concrete on the construction of the Texas and Pacific freight terminal in Fort Worth. H. K. McCollum used 8000 cubic yards of the Tucker concrete on the Henderson Street underpass in Fort Worth for the T. & P. R. R.

As is indicated by the name, Transit-Mix concrete is mixed enroute to the point of delivery. The various materials in required proportions are dumped into a special mixer body on the truck in the material yard. The mixer is started and operates while the truck travels to the job. On arrival the mixed concrete is ready to dump into the forms

or to elevator, buggies or cars where the truck cannot drive directly to the point of placement.

The Tucker Concrete and Material Company uses seven Transit Mixers, Incorporated machines mounted on White trucks. Five of these machines are 2½ cubic yard mixers mounted on model 51-A special Whites and two are 2 cubic yard mixers mounted on model 61 White trucks. Their plant is a Blaw-Knox four compartment combination cement, sand and gravel weigh-batcher. Blaw-Knox bulk cement storage bins are used. A Bucyrus-Erie Type 1035 clamshell equipped with 50′ boom and 1 cubic yard Owen Type "K" bucket handles all of the aggregate unloading it from cars either directly into the bins of the weigh-batcher or into nearby storage compartments and then into the weigh-batcher. Gifford-Hill and Company, Incorporated sand and gravel from their Hart, Texas plant and Gifford-Hill and Company, Incorporated rock from their Allamore, Texas quarry are the aggregates used.

Tucker Concrete and Material Company is also retail sales agent for Gifford-Hill sand, gravel and stone and for that end of the business use three White dump trucks and a P&H ¾ cubic yard gasoline clamshell with 40′ boom. Additional trucks to satisfy their demands for this service are rented.

Operations were started in June of last year and during the balance of 1930 the plant was in operation about 2,700 hours. They have delivered as much as 600 cubic yards of specification concrete per day.

E. A. Tucker, President and S. Vance Evans, Vice President devote a good deal of their time to the sales end. W. W. (Bill) Somerville superintends the plant operations. Clyde Garrett, Secretary, is in charge of the office.

Dependability of time schedules on deliveries has been responsible for the enthusiastic manner in which Tucker Transit-Mix Concrete has been received in the Fort Worth territory. Inasmuch as the clamshell-crane is responsible for feeding all of the material to the weigh-batcher to enable all of their trucks to work on schedule it has been very gratifying to Messrs. Somerville and Tucker to see the Type 1035 performing every day, and sometimes day and night without a delay. Maintenance costs have been negligible on this machine during 2700 hours of operation.

All in a Day's Work

St. Louis Contractor proves value of accurate spotting in setting steel.

FRUIN-COLNON, well-known St. Louis contractors, recently erected a garage for the Pevely Dairy Company at Grand and Chouteau avenues, St. Louis. The long steel trusses, weighing 12 tons and measuring 134 feet in length, brought forth a multitude of engineering suggestions as to the best manner of swinging these trusses into place. The advice ranged from gin poles to a flock of machines as the standard method for this erecting job. But Fruin-Colnon's able erecting foreman, Charles Caress, turned a deaf ear on all these suggestions — he had his own idea about swinging this steel into place. Calling Operator Luther Fritti and the company's caterpillar-mounted Type B-2 Bucyrus-Erie, Foreman Caress directed operations from the ground. The machine was spotted in the desired place — the truss was hooked on — while a skeptical crowd of spectators boldly prophesied failure. Caress wig-wagged to Fritti — the B-2 braced itself — chugged-chugged and lifted the steel skyward. More wig-wagging, and the steel workers up on the framework did the rest. A crew of four men with the foreman and operator set four of these trusses each day until the steel structure was completed.

Commenting on the good judgment of Foreman Caress and the splendid performance of the Type B-2, Operator Fritti says: "As operator on the machine with 22 years' experience setting steel, I will say that I never saw iron handled with any more skill. Anyone can set heavy loads of iron, if he has a machine that would, if necessary, lift twice the load, but when you have just all you want and a little more, then you are in a position where you can't back up or go ahead. And as we all know, it is a bad policy to either boom up or out with 12 tons. In this case, it was a matter of getting spotted just right before the load went up, and that is just what we did."

Difficult Quarry Problems Conquered in Building Spanish Port Improvements

Puertos Y Pantanos uses electric shovels for difficult rock loading at Santa Pola. Thirty percent of digging consists of stone weighing from 5 to 10 long tons.

Looking out over the jetty at Santa Pola. Here cars of rock from the quarry are dumped into drop bottom barges carrying 600 long tons.

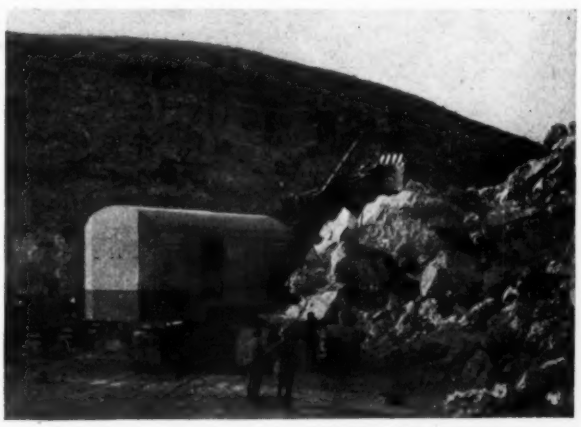
PUERTOS Y PANTANOS, well-known Spanish firm of contractors, have their head office in the north of Spain at Bilbao. Although its founders have been in this line of business for many years the firm did not start to operate under the new name until April 1928. They are the owners of a Bucyrus-Erie 68-C steam shovel on caterpillars, and a Bucyrus-Erie 50-B Ward Leonard electric shovel, at work at Santo Pola, 10 kilometers south of Alicante, right on the edge of the Mediterranean, in the extreme southeast of Spain. They have recently installed two additional Bucyrus-Erie, Ward-Leonard 50-B shovels, one for construction of the Soller Harbor in the Balearic Islands and the other assisting their older 50-B in their quarry at Santa Pola where they load rock for breakwaters.

Drilling and blasting difficult

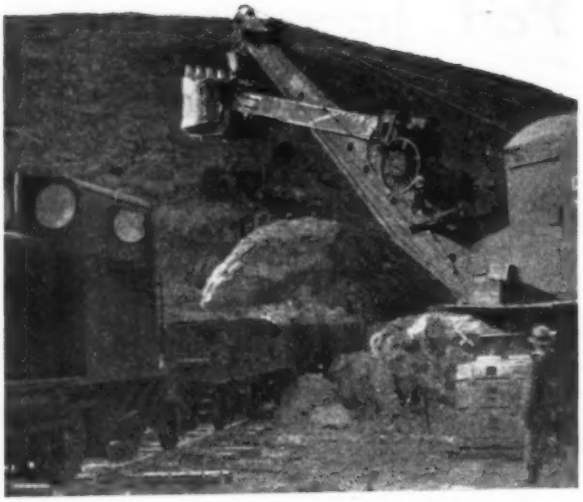
The accompanying illustrations show clearly the extremely difficult digging which is being encountered at Santa Pola. This quarry supplies the rock for the construction of the Torrevieja Port located some 20 kilometers (12½ miles) south of Santa Pola. This project requires 1,200,000 tons of limestone rock.

The limestone rock which is being excavated stands in a face some 40 feet or 45 feet high, and the rock is extraordinarily difficult to blast because it is a peculiar form of limestone which is exceedingly hard, and irregular in formation, being split up by patches of fossilized sea-shells, etc. In addition, it contains large pockets of earth, with the result that great difficulty is experienced with their well drills, owing to the bits getting jammed in the hole, and also, of course, much powder is wasted through blow-outs into these pockets of earth when blasting.

In the quarry the rock is blasted down in bank shots, shooting 8 holes at a time. They have three Keystone drills, drilling 20 centimeter (about 8-



In handling the large rock, weighing up to and over 10 tons each for breakwaters chain slings are slung from the dipper handles of the 50-B just behind the dipper.



Loading a rock weighing about 18,000 pounds.

inch) holes. The holes are spaced 4 meters (13.12 feet) apart and 3 meters (9.84 feet) back from the face. They do not spring the holes, but load 300 kilograms (661.3 pounds) per hole. They get down from a good blast about 12,000 tons.*

The rock is transported from the quarry in 10-ton wooden cars which they have constructed themselves, to their jetty about 600 yards away. This jetty for loading rock to barges they have built themselves. To a depth of 17 feet this consists of blasted rock dumped into the sea beyond which extends a wharf some 300 feet long built of wooden caissons filled with stone. As the quarry is some 90 feet above the level of the wharf the cars are let down an inclined track by cable. On the jetty is a Babcock & Wilcox electric crane, of 12 tons capacity at 10 meters (32.8 feet) radius. This crane picks up the cars and tips them into the 600-ton steel barges of the hydraulic-control, drop-bottom type, which are alongside. These very fine barges were built in Spain.

Classifying rock and loading large blocks complicates loading problems

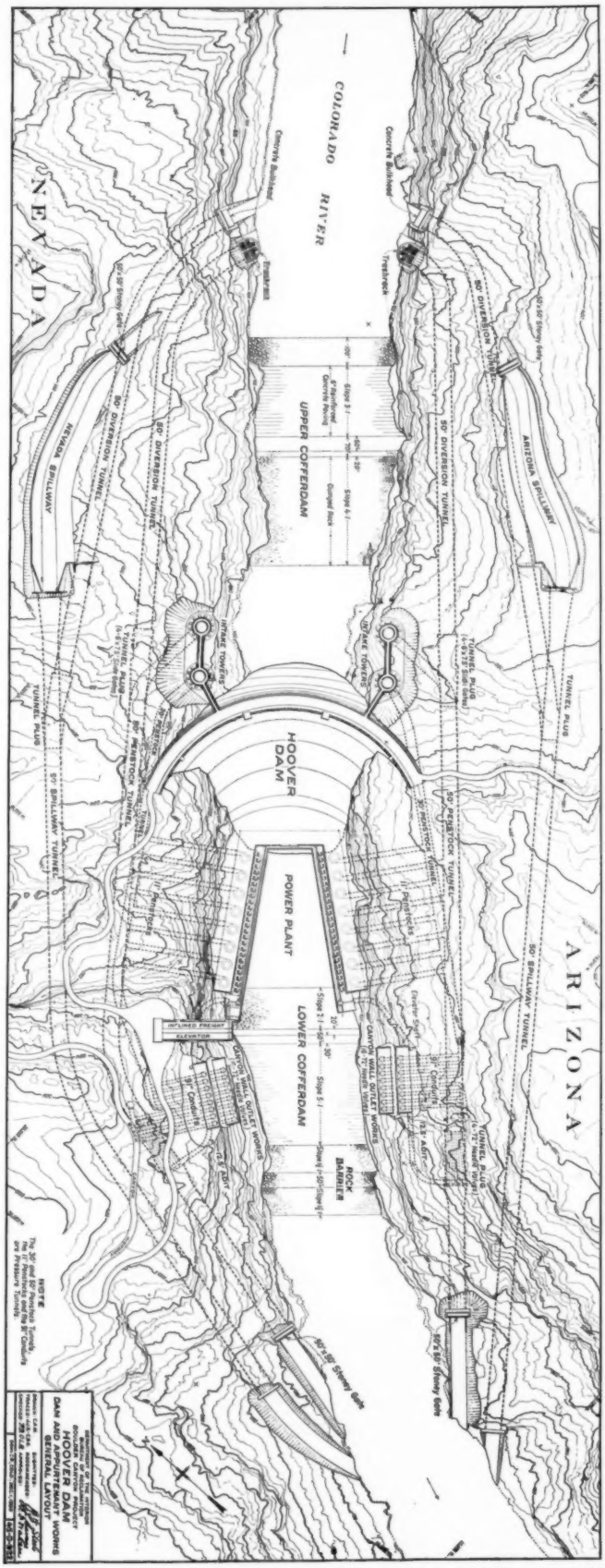
Loading the rock at the time of our visit, one Bucyrus-Erie 50-B Ward-Leonard 2-yard shovel was employed; the second Bucyrus-Erie has since been installed. As a result of the peculiar form of the limestone, naturally, the digging is extraordinarily bad. In fact, it is as bad a rock loading job as could be seen. Adding to the difficulty of loading is the fact that they want the stone in big blocks, and consequently a great part of the work is loading, by means of chain slings, blocks weighing from 5 to 10 tons. Blocks larger than these are handled by means of the chain slings slung from the dipper handle behind the dipper, without difficulty. Thirty per cent of the digging consists of

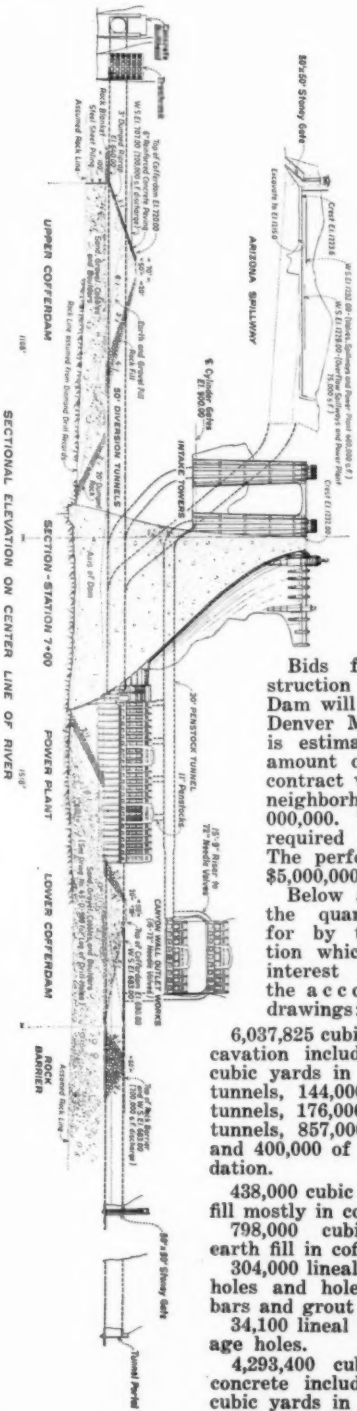
(Continued on Page 126)

*Tons as referred to in this article are long tons of 2,204.6 pounds.

General view of quarry. Note the large rock loaded by the Bucyrus-Erie 50-B electric shovel and filling an entire car.

Hoover Dam Bids open Mar. 4th





Bids for the construction of Hoover Dam will be opened at Denver March 4th. It is estimated that the amount of this single contract will be in the neighborhood of $50,000,000. The bid bond required is $2,000,000. The performance bond $5,000,000.

Below are a few of the quantities called for by the specification which will be of interest in following the accompanying drawings:

6,037,825 cubic yards of excavation including 1,563,000 cubic yards in the diversion tunnels, 144,000 in spillway tunnels, 176,000 in penstock tunnels, 857,000 of common and 400,000 of rock in foundation.

438,000 cubic yards of rock fill mostly in coffer dams.

798,000 cubic yards of earth fill in coffer dams.

304,000 lineal feet of grout holes and holes for anchor bars and grout bars.

34,100 lineal feet of drainage holes.

4,293,400 cubic yards of concrete including 3,400,000 cubic yards in the dam.

Placing 119,520,000 lbs. of steelwork.

The work will get under way promptly as soon as the successful bidder can assemble equipment, supplies and crews at the site.

Present Progress on Boulder Project

Laying the last rail on the U. P. Branch line. Across the shifting sands of Nevada's desert a new railroad now extends from the main line of the U. P. at Boulder Junction to Boulder City, a distance of 22.71 miles, the last rail being laid on January 24th, 1931. Very shorty an additional 7.17 miles will be laid by the Lewis Construction Co. from Boulder City to the dam site.

Temporary roads are being cut towards the dam site to enable the contractors to move in their heavy machinery. A camp in the distance is seen where 150 men will be quartered. Contract for the new Highway which extends from Boulder City to the dam site was awarded to General Construction Co. of Seattle and sub-let to R. G. LeTourneau, Inc. of Stockton, California.

Mr. LeTourneau is starting about a mile and a half from the dam site, taking the hardest part first with his Bucyrus-Erie 50-B Diesel shovel. The accompanying view shows machine moving in over a temporary road and the going is, as you will note, plenty rough. This particular grade is about 25% but the 50-B climbed up without any hesitation.

You'll Make Money by Buying Good Equipment and Taking Good Care of It

So say Frame & Zimmer, who practice what they preach

Office and shops of Frame and Zimmer, Incorporated.

A FEW YEARS ago down in South Bend, Indiana, a couple of young fellows started out in the trucking game. They took good care of their equipment — hustled for business and hustled for the profits after they got a job. They made money — figured they could make more money if they had some digging equipment. So they bought a shovel, later another — hired others as they needed them. They took care of this additional equipment in the same way as they had their trucks, they hustled up business and put their jobs through ahead of schedule. They bought a dilapidated old factory building on West King street where property was cheap, but as convenient a location as could be found in South Bend for their

Neat rows of overhauled and newly painted equipment ready for the word "Go."

business. They rebuilt the old building into a neat, well-planned, well-equipped truck garage, shop, and office.

Today this firm, Frame and Zimmer, Incorporated, is known as being one of the most enterprising and successful excavating contractors in its part of the state.

200,000 cubic yards in two months

In two months of 1929 they moved over 200,000 cubic yards of dirt on a flock of miscellaneous jobs — and made a profit on every yard of it.

Last year was rather quiet around South Bend and most of Frame and Zimmer's jobs were small ones. They were bid intelligently and handled efficiently however, so the firm entered the new year probably in a good deal better position than many who have handled a greater volume during these rather difficult times.

Their equipment includes two Bucyrus-Erie shovels — a Gas+Air and Type B steam; 18 trucks — five new G. M. C.'s, eight Macks, one Indiana, and four Federals; one Barber-Greene conveyor-type excavator; a Universal truck crane; a fleet of wheeled scrapers, fresnos, etc.

In going over their operations, one is impressed by the excellent appearance and condition of their equipment.

"There's more in a fresh coat of paint"

"There's more in a fresh coat of paint," says President C. E. Zimmer, "than just the advertising it gives you, for people *do* see and remember your name when it's on a clean, newly painted piece of equipment. The men who work for you feel more like taking care of the equipment if it looks new. They don't abuse it — and they take more pride in their job and turn out a bigger day's work. We

C. E. Zimmer shows why he likes the big dual balloons on the G. M. C. dump trucks. "You can take these anywhere you want to go," says Mr. Zimmer.

(Continued on Page 126)

THE EXCAVATING ENGINEER

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THE MOST important factor that leads to business improvement after a serious business depression, is probably the feeling of individuals. It is the collective thought of the average man that gradually brings about the turn. This general feeling, having been exceedingly pessimistic and gloomy for several months, is beginning to see the way out, is beginning to discover brighter prospects on the horizon.

Doctor Julius Klein, Assistant Secretary of Commerce, in an address before the Manufacturers Association of Bridgeport, Connecticut on February 12th opened his talk with, "As we emerge from the depression—and authoritative testimony indicates that the upward climb is on the way—there is a growing realization that once more, as in every period of trial, business has learned several salutary lessons. It has been through a broadening, though trying experience, a gruelling test in a truly relentless crucible."

The various indicators of business have not moved far enough in the right direction to forecast just how rapid this increase will be. But our experience during 1930 suggests that a gradual rise would be better than a rapid one.

Bond prices, which have for some time been considered a second rate indicator, had been moving upward for several months in a very promising manner when the uncertainty caused by Congressional consideration of the proposal to pay off soldiers bonus certificates (in cash involving a huge Government bond issue) prevented further rise and spoiled the value of that particular information as an indicator for the business of the immediate future.

Ordinarily, activity in the bond market and bond prices are an indication first, that people have money to invest and are investing it carefully; second, that business men are borrowing money for new projects.

It is interesting to note that in the past recoveries from major business depressions have usually occurred in Spring or in Fall. These are naturally periods for increases in business activity to get underway, partly because normal business is more active during these periods than during the mid-Winter or mid-Summer.

People never like to buy when prices are exceedingly high or on a falling market. They naturally want to buy at the bottom and it is this that not only brings about a depression but a rise in business activity. Perhaps one of the most valuable indicators available, to show to what extent this "purchasing sentiment" has changed, is the figure for residential construction. It is exceedingly interesting to note the F. W. Dodge report showing, in the New York Metropolitan area, an increase of residential building of 18 per cent for the month of January, 1931 over January, 1930. This in spite of the fact that there was a 17 million dollar drop in total construction for that area. As this figure begins to increase in other areas we may rest assured that both general business and other types of construction will follow.

January comes forward with some promising indications of renewed activity for the building industry, and consequently for many allied industries, according to F. W. Dodge reports of contracts awarded during the month.

Three of the thirteen Dodge territories show gains over both January of last year and over the previous month, December. Three additional territories show gains over December and one additional shows a gain over January, 1930.

Building activity in Southern Michigan, the region surrounding Kansas City, (Western Missouri, Kansas, Oklahoma, and Nebraska) and the territory of New Orleans (Louisiana, Southwestern Arkansas, and Southeastern Mississippi) produced an increase this month over both January and December, 1930.

Weighing the current month against January of a year ago, the St. Louis, Kansas City, and New Orleans territories contribute a combined gain of $6,583,800 in favor of the year just started, with the Kansas City region leading by $2,983,800 over January, last year.

In the thirty-seven states east of the Rockies, the total contracts awarded for new buildings during the past month amounted to $227,956,400 as compared with $323,975,200 for the first month of last year. Public works and utilities lead in this total with $95,211,100. This class is followed by non-residential with $78,370,800 and by residential with $54,375,500.

In the second paragraph of this article we quoted the opening of an address by Doctor Julius Klein. In that address he gave "A Post-Depression Decalogue." While all of this decalogue is not readily

adapted to the problems of the contractor certain of them are so timely and so definitely valuable, that we reprint the ten rules below.

1. Don't blame the depression for everything which has marred the tranquility of the economic scene since 1929. The collapse of many parts of the business structure has had widespread repercussions, but there are other and in many cases deeper seated defects having nothing to do with the regretable episodes of the past sixteen months. Lack of vision, archaic methods, antiquated policies, within individual firms and trades, have all contributed toward weakening those involved so that when the depression came it was but the last straw, the final episode in a long sequence of causes, rather than the fundamental reason for current difficulty.

2. Don't compare peaks with slumps. Both are abnormalities. The more we flatten out the peaks, the better will be our control of the slumps.

3. Don't fall into the fallacy so general among European industrialists of expecting the wage earner to bear the brunt of the readjustment. Before resorting to that extremity, let industry be sure that **every** other one has been exhausted. There is plenty of slack elsewhere—careless production, inefficient management, slipshod selling. Talk of drastic slashes in American living standards and "permanent lows" in wages borders closely on economic lunacy.

4. Don't cut loose from associated activities in business. Such short-sighted "economy" is the sheerest extravagance at this particular stage of business readjustment. There never was a time in the last ten years when co-operation was more invaluable. No one shoves off in a rowboat from a liner in a mid-Atlantic storm to save passage money.

5. Don't ignore the amazing power of the new technology. No peril is quite so disastrous in business these days as a smug, self-satisfied assurance that present technique in production will be permanent. Our engineers, our chemists, our inventors, have never shown such relentless zeal as at present. They have largely been responsible for lifting the country out of every preceding crisis. Those industrialists who cling closely to them right now will have good reason to be thankful.

6. Don't cut marketing research. Our gravest deficiency still lies in the field of defective distribution. Our major business problem these days is not what can be made, but what can be sold. If the billions wasted there would be salvaged, even in a modest proportion this year, it will be the largest single contribution to our recovery. Closely associated with this is the need of sustained, farsighted advertising as an invaluable adjunct to move effective and economical distribution. The stimulus, not of blatant ballyhoo, but of well-founded publicity was never more necessary than now. There can be no recovery of business with lagging demand, or unwarranted timidity of consumption.

7. Don't overlook the stabilizing value of foreign markets. They cannot be exploited on short notice. Many a firm has survived this recent storm because its executives had the foresight in fair weather to plant an anchor in two or three carefully selected markets far overseas.

8. Don't fall again into the perils of mass mania, the delusion that the sole purpose of business is "busy-ness." Quantity operations whether in output or distribution are by no means an invariable assurance of quantity profits. The latter are indeed elusive unless than fateful margin between income and outgo is thoroughly sustained and respected (not merely suspected). The dinosaur was a first-class example of mass production. But he and his kind have all been quite dead for several million years because too much of their "mass" was below their ears.

9. Don't overlook the perils of obsolete equipment. It is wiser to have the junk heap outside the factory than in it. Nearly half (48 per cent to be exact) the machinery in our own American factories today is over ten years old. The paralysis of advancing senility is all the more dangerous because its stealthy approach is so painless, so easy.

10. Don't be stampeded by unfounded rumors. They are the fodder on which crises flourish. In these days of abundant, accurate statistical data and superb communication facilities, there is no longer any valid excuse for mischievous gossip-peddling among otherwise sensible business executives. The mendacity of every irresponsible, dangerous rumor can be and should be instantly squelched. And it will be, as long as ours is still a business leadership of men, not mice. The time for the calamity complex has passed.

Difficult Problems Conquered in Building Spanish Port Improvements

(Continued from Page 120)

large blocks of this description. Where there is enough rock of small size to permit the shovel to pass it through the dipper, they are able to get an output of 1450 tons in 18 hours with the one 50-B. On the average, including the classifying of the rock, however, they get approximately 900 tons in 18 hours.

Complete cycle in 27 seconds

The 50-B has proved capable of dealing with this very heavy work successfully, and is most economical, using only 500 K.W. hours in 18 hours. The shovel, when visited, was doing a complete digging cycle, swinging 180 degrees and digging the rock from the very heavy pile of rock shown

in the illustrations, in 27 seconds. There is a very well equipped workshop on the job and two sets of Ingersoll-Rand compressors, the whole driven from a central power station which they have constructed themselves, and consisting of two generators giving 2,300 volt A.C. current, the motive power being two 180-H.P. 4-cylinder M.A.N. 4-cycle Diesel engines.

The directors of the company should be complimented on the able way in which they are handling a very difficult job.

South Bend Contractors say it Pays to Buy Good Equipment and Take Good Care of it

(Continued from Page 123)

have our own mechanics in the garage — every truck is kept in perfect condition, ready to give the same kind of service today as the day we bought it. Every winter we overhaul trucks and shovels thoroughly. After we've gone over them

Operator Bob Berkholder and the Type B Bucyrus-Erie grade a street between garage and power plant for the Indiana & Michigan Electric Company.

mechanically, they all get a fresh coat of paint to start the season. And we keep them clean through the season, too. It pays."

Out alongside a well-built, galvanized storage shed across the street was evidence of how Frame and Zimmer care for their smaller items of equipment. It was in the spring when we made this South Bend visit, and there stood the veterans of many a road-grading job—wheelers, slips, fresnos, tool boxes, water wagon, drag and morman. But to look at them you'd say they were fresh from the factory — smooth, sharp edges on the blades, not a smudge of rust anywhere, neatly lettered signs on tool boxes and tank over the pleasing, clean, grey paint. All ready to move in on the first job of the season at a moment's notice!

Among the jobs Frame and Zimmer handled last season are the Riverside Drive with 20,000 yards of grading, a 15,000-yard basement and about 20,000 yards of miscellaneous excavation at Bendix, 30,000 yards of stripping at a gravel pit, and other small jobs.

Executives of Frame and Zimmer, Incorporated, are C. E. Zimmer, President; S. Zimmer, Vice President; Fred Frame, Secretary and Treasurer; E. E. Anderson, Superintendent.

Michigan County has 300 Miles of Highway Wider Than 40 Feet

Wayne County has a story, and an exhibit, that warrants the attention of every community suffering from trafficitis. On September 1st of last year, this Michigan county had completed no less than 624 miles of hard-surfaced roads — but the amazing feature is that some 300 miles of this pavement is of a 40-foot width or greater. In addition, Wayne County has 35 grade separations, 33 of which are at railroad intersections and two at important highway intersections. During the year 51 miles of pavements were widened and 32 miles of new pavements were built.

And another outstanding thing on the Wayne County program is the continuous acquisition of wider rights-of-way. These are being acquired at an average rate of about a mile a week. Consequently when money is available for wide pavements, and there is a need for them, Wayne County has a place to put them.

Wayne County is looking at motor transportation from the business end as well as the pleasure. Well-paved arteries leading out in all directions from Detroit have tended to equalize real estate values; they have made it possible for city workers to live in spacious and "countrified" districts away from the city; they are helping downtown Detroit merchants and business men retain their customers.—*E. E. Duffy.*

A Correction

In describing the operations of Truax-Traer Coal Company at St. David, Illinois, in our February issue we stated that P. E. Atchley was Pit Boss in charge of the St. David pit. Superintendent A. H. Hayes has called our attention to our error in this respect. Owing to an accident, Mr. Atchley left Truax-Traer shortly after our visit to this mine last spring. William Kunze has, since that time, ably handled the responsibilities of this position. Mr. Hayes comments: "Most of the credit for our large December tonnage and conditions of the pit is due to Mr. Kunze."

In December Truax-Traer loaded at the St. David Mine a total of 198½ hours and in this time loaded a total of 50,776 tons of coal. One day's loading was 60 railway cars with a tonnage of 2,960. Loading for the entire month totaled 1,052 standard railway cars.

Coal is loaded in the pit by a Bucyrus-Erie 75-B to Sanford-Day cars hauled by Plymouth locomotives. Stripping is with a Bucyrus-Erie 750-B.

FIELD NOTES

Home-Made Strainer for Hose End

A home-made strainer of any kind is not easily made and attached to the end of a small hose, but the above makeshift was rigged up and put on in the need of the moment, working quite satisfactorily. A short wooden plug was whittled and forced into the water end of the hose. A portion of the hose was cut out longitudinally for about six inches to within an inch or so of the end into which the plug was driven. The perforated casing of a discarded oil stove wick was cut in two, flattened, and wrapped around the hose end as shown, covering completely the half portion of the hose cut away. Some small broom wire held it on snugly. A great deal of foreign matter was caught and held by this little strainer attachment before the suction was checked in the least.—*Frank W. Bentley, Jr.*

Rats!

Perhaps some of our contractor readers are bothered with the destructiveness of rats around camps or barns.

The following suggestions from the U. S. Department of Agriculture may be of value in eliminating the pests.

The most efficient means known for destroying rats is by poisoning, and is recommended for the purpose wherever it can be used with safety. When poison cannot be used, trapping is suggested.

Investigators and demonstrators of the U. S. Biological Survey recommend powdered barium carbonate, an inexpensive poisonous drug, as being best adapted for poisoning rats. It has the advantage over phosphorous, arsenic, and strychnine in being odorless and tasteless. The bait containing it is readily eaten by these wily pests; also it is slow in action, so that rats affected by it usually have time to leave the premises in search of water before they succumb.

A variety of bait used separately not only gives the rat a choice of foods, but tends to make him less suspicious, such as: 1. Meats or other animal substances, hamburger, fish, sausage, liver, bacon or cheese; 2. Vegetables or fruits — canteloupe, apple, tomato, banana, canned corn, squash, boiled carrots or baked sweet potatoes; 3. Cereals — oatmeal, corn meal, bread, flour or cake. The powdered barium carbonate should be thoroughly mixed and worked into the soft bait in proportion to one part of the drug to four parts of the selected food. A teaspoonful of the poisoned bait can be placed on a small piece of cardboard, or in a paper sack, and put where it is easily accessible to rats.

Uneaten bait should be removed the following morning, as it becomes bitter and will not be eaten.

As barium carbonate is a poison, care should be exercised in keeping it out of reach of children, and from domestic animals and fowls.

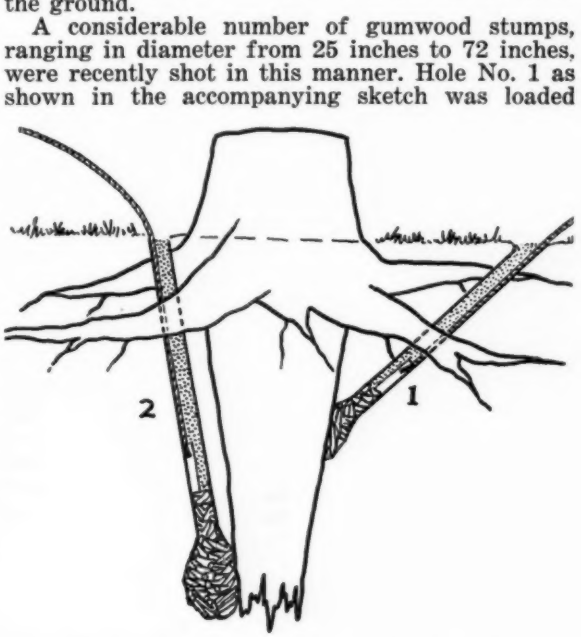
In using traps, the bait plays an important part. Use plenty of it. At many places where the rats burrow around buildings they can be destroyed by saturating a piece of cotton or other absorbent material with carbon disulphide and inserting the same as far as possible in the burrow and closing the opening with moist earth. Or, the exhaust of an automobile, which is directed by means of a hose to the rat burrow, can be used, the engine being allowed to run at a moderate speed for ten minutes.

Effective Way to Shoot Tap-Rooted Stumps

Originally developed for cleaning right-of-way for pipe lines, a very effective way of shooting tap-rooted stumps is reported by the du Pont Company. The new method speeds up the removal of southern pine, gumwood and similar stumps, especially in sandy soil.

Two charges are placed on opposite sides of the stump. The shallow and lighter "relief" charge is fired first by using a shorter fuse and removes the surrounding soil so that the following or "lifting" shot can more easily throw the stump out of the ground.

A considerable number of gumwood stumps, ranging in diameter from 25 inches to 72 inches, were recently shot in this manner. Hole No. 1 as shown in the accompanying sketch was loaded



with from one to six sticks of Agritol and shot first, blowing out the soil as indicated by the dotted line. Hole No. 2 was loaded with from 12 to 56 sticks of Agritol and shot next. The proper timing of the shots was controlled by the use of a longer length of fuse for the second hole. Both fuses are lighted at the same time and it is important that the blaster use sufficient fuse to allow himself time to light both fuses and withdraw to a safe distance.

Excavation for 1931 Highway Construction

ADDITIONAL information relating to 1931 highway construction appears below. For complete reports, refer to the January issue, where forecasts for the entire 48 United States and seven of the Canadian Provinces were presented. Supplementary figures on the work to be done in Colorado, Florida and Georgia were published in February.

California

The biennial State highway budget recommending expenditures of $63,322,500 on the State Highway System for the ensuing two fiscal years has been presented to the Legislature by Governor Rolph. This budget covers contemplated expenditures for all State highway purposes including construction, reconstruction, maintenance, purchase of rights-of-way, and engineering and administrative costs. While the budget is for the fiscal years of July 1, 1931 to June 30, 1933, it is expected that the funds provided in the budget will be available immediately by adoption of the Legislature and approval of the Governor. Below we show the amount to be expended on various highways for construction and reconstruction projects as provided in the budget.

Redwood Highway (San Francisco to Oregon line near Monumental) $2,768,400; Pacific Highway (Red Bluff to Oregon line) $126,300; Pacific Highway (East Side-Sacramento to Tehama Junction via Marysville) $118,850; Pacific Highway (West Side-Tehama Junction to Benicia) $205,000; Golden State Highway (Sacramento to Los Angeles) $4,550,100; Coast Highway (San Francisco to San Diego) $2,852,200; Victory Highway (Roseville to Nevada line via Auburn) $1,370,200; Myers to Nevada line via Truckee River $142,200; Tahoe-Ukiah Highway $71,000; Placerville-Tahoe Highway (Sacramento to Nevada line via Placerville) $544,850; Mother Lode Highway (Auburn to Sonora) $77,800; Feather River Lateral (Pacific Highway to Quincy via Oroville) $821,000; Trinity Lateral (Redding to Arcata via Weaverville) $164,300; Downieville Lateral (Nevada City to Downieville) $50,000; Alturas Lateral (Redding to Nevada line via Alturas) $369,100; Red Bluff-Susanville Lateral (Red Bluff to Nevada line near Purdy's via Susanville) $597,600; Klamath River Lateral (Redwood Highway near Klamath River to Pacific Highway) $172,300; Ukiah to Mendocino State Hospital $30,000; Bayshore Highway (San Francisco to San Jose) $1,369,500; Skyline Boulevard (San Francisco to Glenwood) $300,000; Sacramento-Oakland Highway $389,600; Albany to Martinez $396,000; Stockton to Santa Cruz via Oakland $772,600; Salida to Route 23 at Junction (Salida on Valley Route North of Lodi, through Sonora, over Sonora Pass to Junction North of Bridgeport) $154,400; San Andreas Lateral (Golden State Highway, Valley Route, near Lodi to Route 23, near Silver Creek, Calaveras County) $367,000; Manteca to Route 5, near Mossdale School, $204,000; Pacheco Pass Lateral (Califa, on the Valley Highway, to Gilroy on the Coast) $51,000; Redwood Park Road (Saratoga Gap near Redwood Park to Blooms Mill) $271,600; San Lucas to Sequoia National Park, $362,000; Carmel-San Simeon Highway $679,000; East of Sierra Highway (Saugus to Route 11 at Alpine Junction) $875,000; El Rio to San Juan Capistrano (portion of the Coast Route) $910,200; Arroyo Seco Highway (La Canada to Mt. Wilson Road via Arroyo Seco) $520,000; Bear Lake Highway (San Bernardino, end of county pavement to Bear Lake) $650,000; Arrowhead Trail (San Bernardino to Nevada line near Jean) $935,000; Colton-Los Angeles Highway $540,000; West of Clarement to Riverside, $150,000; San Bernardino to El Centro, $390,000; San Diego to El Centro, $824,400; El Centro to Yuma, $441,000; Mecca- Blythe Highway, $300,000.

Missouri

Chief Engineer T. H. Cutler of the Missouri State Highway Department calls our attention to an error in our January issue in reporting an estimate of $28,000,000 for maintenance in Missouri for 1931. It is expected that maintenance in Missouri for 1931 will approximate $4,000,000. The Missouri State Highway Department expects to let contracts during 1931 for 338 miles of concrete pavement, 925 miles of gravel surfacing and 250 miles of grading under separate grading contracts. The total estimated cost of this construction work is, in round numbers, $30,000,000. Approximately 12 per cent of this will be covered by Federal Aid refunds.

Megarry Brothers of Bain, Minnesota used their Bucyrus-Erie Gas+Air loading to GMC "Big Brutes" on this shouldering job on Minnesota Highway number two about five miles east of Crookston, Minnesota

New Jersey

The total funds available for State Highway construction in New Jersey for 1931 amount to $37,000,000. In order to be prepared to push highway work through, the tentative program for construction as prepared by the State Highway Department, includes, in all, work totaling $55,980,500. This gives sufficient elasticity to permit the work to proceed without stopping, if not on one project on another.

The tentative construction program (gross) includes the following: $2,585,000 in Atlantic County; $3,450,000 in Burlington County; $10,200,000 in Bergen County; $1,455,000 in Camden County; $1,400,000 in Cape May County; $240,000 in Cumberland County; $13,800,000 in Essex County; $820,000 in Gloucester County; $10,135,000 in Hudson County; $87,500 in Hunterdon County; $975,000 in Mercer County; $1,300,000 in Middlesex County; $1,175,000 in Monmouth County; $3,488,000 in Morris County; $690,000 in Ocean County; $1,100,000 in Passaic County; $700,000 in Somerset County; $250,000 in Sussex County; $2,115,000 in Union County and $115,000 in Warren County.

"I can't marry you," said the justice of the peace to the nervous bridegroom. "If this girl is only seventeen, you will have to get her father's consent."

"Consent!" yelled the groom. "Say, who do you think this old guy with the rifle is—Daniel Boone?"

The meek little man was walking home from the funeral of his big masterful wife. Suddenly a roofing tile fell and struck him on the head.

"Gosh," said he, "Sarah has arrived in Heaven already."

"Whaffo' you sharpenin' 'at razor?"

"Woman, they's a paih o' gemmun's shoes undeh you' bed. If they ain't no niggah in them shoes—Ah'm gonna shave!"

SHOTS FROM THE FIRING LINE

Contract for Railroad to Site of Hoover Dam Awarded to Lewis Construction Company

By A. J. KOENIG

Contract for the building of 10½ miles of railway from Boulder City to the Hoover Damsite was awarded to the Lewis Construction Company, Los Angeles, on their bid of $455,509.50. The contract entails 270,000 cubic yards of common excavating and 202,000 cubic yards of rock excavation. There is also 574,000 cubic yards of overhaul and 384,000 cubic yards of long haul borrow. The price on common excavation was $0.22 per yard. Rock excavation $0.80 per yard.

Officers Re-elected at Sand & Gravel Convention

At the St. Louis Convention January 27th to 29th the National Sand and Gravel Association re-elected their President Robt. J. Potts of the Potts-Moore Gravel Company, Waco, Texas. H. V. Owens of the Eastern Rock Products, Inc., Utica, N. Y., was re-elected Vice President, and H. S. Davison of J. K. Davison & Bros., Pittsburgh, Pa., was re-elected Secretary and Treasurer.

In co-ordination with the National Crushed Stone Association a resolution was passed requesting various government bodies to secure adequate investigation and action to prevent industry from price conditions tending to ruin its members. Another resolution commended the work of the U. S. Bureau of Mines and requested extension of this work. Market extension, improved product and cost accounting were discussed by various speakers of nation wide fame in their respective fields. The result was an excellently balanced and valuable program of distinct interest to the entire industry.

National Crushed Stone Association Has Successful Meeting

The St. Louis Convention of the National Crushed Stone Association held January 19th to 22nd was the largest ever held by this industry. Over 600 registered, an increase of at least 10 percent over the previous record.

Officers elected:

Albert L. Worthen, vice-president of the Connecticut Quarries Co., Inc., New Haven, Conn., was elected president. Regional vice-presidents were elected as follows: C. M. Doolittle (Canadian), Hamilton, Ont.; A. J. Wilson (Western), Watsonville, Calif.; E. Eikel (Southwestern), New Braunfels, Tex.; A. S. Lane (Eastern), Meriden, Conn.; H. E. Bair (Central), Toledo, Ohio; W. R. Sanborn (Northern), Kankakee, Ill.; T. I. Weston (Southern), Columbia, S. C., and Porter W. Yett (Northwestern), Portland, Ore. Board of directors was elected as follows: Max A. Altgeld, New Braunfels, Tex.; W. M. Andrews, Youngstown, Ohio; H. E. Bair, Toledo, Ohio; H. E. Billman, St. Louis, Mo.; A. J. Blair, Milwaukee, Wis.; L. J. Boxley, Roanoke, Va.; C. D. Brewer, Duluth, Minn.; L. R. Cartwright, Indianapolis, Ind.; O. P. Chamberlain, Chicago, Ill.; J. E. Cushing, Schenectady, N. Y.; C. M. Doolittle, Hamilton, Ont.; F. O. Earnshaw, Youngstown, Ohio; E. Eikel, New Braunfels, Tex.; Otho M. Graves, Easton, Penn.; F. T. Gucker, Norristown, Penn.; J. L. Heimlich, LeRoy, N. Y.; W. E. Hilliard, New Haven, Conn.; W. P. Hodgkins, Chicago, Ill.; E. J. Krause, St. Louis, Mo.; A. S. Lane, Meriden, Conn.; Thomas McCroskey, Knoxville, Tenn.; B. A. McKinney, West Roxbury, Mass.; F. R. Patterson, Findlay, Ohio; John Prince, Kansas City, Mo.; Russell Rarey, Columbus, Ohio; John Rice, Easton, Penn.; J. A. Rigg, Alderson, W. Va.; H. E. Rodes, Nashville, Tenn.; W. R. Sanborn, Kankakee, Ill.; James Savage, Buffalo, N. Y.; F.

The Annual Banquet of the National Crushed Stone Association, Wednesday Evening, January 21st at the Hotel Jefferson, St. Louis, will long be remembered by those in attendance. Otho M. Graves was Toastmaster, with addresses by Count "Anton Carlson", John B. Kennedy and Senator Joseph T. Robinson.

Shots From the Firing Line — *Continued*

W. Schmidt, Jr., Morristown, N. J.; J. F. Schroeder, Davenport, Iowa; H. M. Sharp, Toledo, Ohio; W. L. Sporborg, Syracuse, N. Y.; J. W. Stull, Rocky Point, Va.; Mortimer Wandell, New York City; T. I. Weston, Columbia, S. C.; G. J. Whelan, Cleveland, Ohio; A. J. Wilson, Watsonville, Calif.; A. L. Worthen, New Haven, Conn.; W. F. Wise, Dallas, Tex.; and Porter W. Yett, Portland, Ore. Representing the Manufacturers' Division on the board of directors: Bruce Shotton, Hendrick Manufacturing Co., Carbondale, Penn., chairman of the Manufacturers' Division; H. M. Davison, Harnischfeger Corp., Milwaukee, Wis., retiring chairman, and Max S. Lambert, Robins Conveying Belt Co., New York City.

Excellent entertainment was furnished through the courtesy of the St. Louis Quarrymen's Association and the Illinois Powder Manufacturing Co., under the very able direction of E. J. Krause, president of the Columbia Quarry Co., St. Louis, and past-president of the association; Col. E. J. McMahon, exectuive secretary of the St. Louis Quarrymen's Association, and C. W. Swanson, sales manager of the Illinois Powder Manufacturing Co.

A valuable and interesting convention program was offered including a comprehensive report on business conditions by representative members.

Highway Between Shinten and Shokei, Taiwan, Japan to Be Started in 1931

As the construction of the 79 mile coastal highway between Suo and Karenko, a magnificent drive along the face of the famous cliffs of the East Coast, nears completion, there is considerable interest in the proposed highway between Shinten and Shokei, the opening of which will make the Suo-Karenko Highway accessible to motorists from Taihoku and southern points of the western half of the island. According to the announcements in the press, construction of this 45 mile stretch will be started sometime in 1931, depending upon available funds. The construction period is placed at from 4 to 5 years. According to these same announcements the total cost of this highway, including a considerable amount of reconstruction on already traversable units, is estimated at 3,250,000 yen ($1,618,500).

Chile to Complete Santiago-Valparaiso Concrete Road in 1931

It is reported that a good concrete road will join Santiago and Valparaiso by the end of 1931. Work is being pushed on with increasing rapidity. With the completion of the road, which will be about 135 kilometers (84 miles) in length, it will be possible to motor in comfort between the two cities in little more than two hours. Sections of the road are already completed and one part—as far as Malloco in the direction of San Antonio—was opened by President Ibanez recently. The Santiago-Valparaiso road is part of a scheme by which Santiago, San Antonio and Valparaiso will be linked by first class roads.

Canada

Quebec Notes

The Provincial Department of Roads, of which Alex Fraser is Engineer, Parliament Building, Quebec, plans on the construction of road between Cascapedia and St. Anne des Monts, Que., which will be 45 miles long.

The City of Montreal plans on paving and widening several streets in that city next spring. Asphalt paving is specified.

Ontario Notes

The Kitchener Suburban Good Roads Commission plans on inviting tenders about March 15 for the construction of one and one-half miles of concrete surfacing on Williamsburg Road, Waterloo County. The road will be 18 feet in width.

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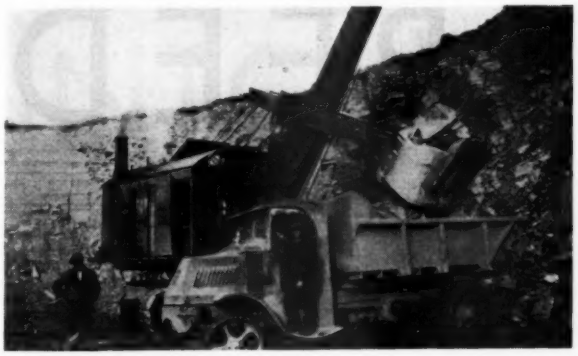

Operator Thomas Kemp of St. Catharines, Ontario, sends us the above picture, showing a Bucyrus-Erie 50-B steamer loading into Mack truck on work of the Dufresne Construction Company. Mr. Kemp operated this machine in this Montreal quarry for 18 months.

British Columbia Notes

Plans are being drafted for a new coast highway to link Vancouver with the pulp and paper mill town of Powell River, some 75 miles to the northwest. Engineers of the public works department are now locating the final stretches of the road and the terminal points for the ferries which will be needed to carry traffic over the water gaps, Jervis Inlet and Howe Sound. The ferry landings will probably be for the latter at Horseshoe Bay and Hopkins Landing. Horseshoe Bay is on the Marine Drive of the north shore, reached from Vancouver over the Second Narrows Bridge (when not out of commission: Necessary now to ferry to North Vancouver). From Hopkins Landing the road is completed to Half Moon Bay and from there is projected as far

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Stop these huge leaks in profits and time. Use a friction material that wears—and wears—and wears. Use Gatke Moulded Brake and Friction Blocks—the **standard** brake and friction material for the majority of original equipment makers. Gatke moulded asbestos frictions and brake linings deliver maximum efficiency all the time. And Gatke service builds this moulded to any specifications. You'll want more information—write to the Gatke Corporation, 228 North La Salle Street, Chicago, for details.

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Owen Buckets

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Cletrac Crawlers are built exactly for this kind of performance—*to make work move faster and cost less.* They are powerful, dependable units that team up well with any kind of equipment on any type of work. Down in the mud of a levee-building job or on the surface of a highway their sure

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tread and uncompromising power make them equally effective — a sure match for big loads and hard pulls.

Whether you need the quick, mobile power of the small Cletrac "15" for a light job or want intermediate or giant power for heavier operations you can match your requirements with one or more of the five Cletrac sizes. With bulldozer, scraper or scoop train—with massive dirt wagons or elevating graders—there's a Cletrac Crawler to fit both the equipment and the demands of the job.

THE CLEVELAND TRACTOR COMPANY
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See the Cletrac dealer for a demonstration or write direct for full information on any or all models.

CRAWLERS

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Shots From the Firing Line — *Continued*

as Pender Harbor. It is possible that a ferry may operate from this point to Thunder Bay, the terminus of the present highway running south from Powell River. This will, however, mean a rather long ferry trip and an alternative route is proposed via Sakinaw Lake to a point opposite Egmont, on Skookumchuck Narrows. In either case there is a considerable stretch of water to be covered by ferry, but the latter is more sheltered.

The City of Vancouver of which C. Brakenridge, City Hall, is engineer, will undertake various civic improvement work to commence in the spring. The project includes $250,000 for clearing and grading new streets; $600,000 for widening one-half mile section of Kingsway from 66 to 99 feet: $1,000,000 program for grading sidewalks and paving.

New England Notes

Connecticut Highway Commissioner John A. Macdonald announced on January 28th the award to successful bidders of eleven of the thirteen highway projects on which, early in the month, the Highway Department received the largest number of bids in its history. The contracts include approximately one million dollars worth of work and cover the first of the projects which Commissioner Macdonald has pushed several months ahead of their scheduled time in order to relieve the unemployment situation.

Work on all of the projects will be started immediately according to contract specifications which require the successful bidders to inaugurate operations within ten days of notification.

The awards were as follows: **L. Suzio Construction Company** of Meriden about 30,884 feet of reinforced concrete on Route 101, Willimantic-Putnam via Eastford; **D. Massili**, Bloomfield, about 7,490 feet of bituminous macadam on Route 307; **John DeMichiel and Brother**, Torrington, a reinforced concrete bridge and approaches over the Bantam River on the Torrington-Litchfield Road; **M. A. Gammino Construction Company**, Providence, Rhode Island, about 6,835 feet of reinforced concrete pavement on the Manchester-Rockville Road, Route 108; **Arborio Road Construction Company**, Hartford, about 14,505 feet of grading and drainage on the Milford Cut-off; **Osborne-Barnes Company**, Danbury, about 31,600 feet of reinforced concrete pavement on Litchfield Road, Route 128; **Charles Smith**, Derby, about 1,200 feet of traprock waterbound macadam at the Schley corner on the Sharon-Amenia Union Road; **Paul Bacco**, Stamford, about 17,795 feet of reinforced concrete pavement on the High Ridge Road; **Joseph McCormick**, East Providence, Rhode Island, a concrete encased plate girder bridge and approaches over the Quinnebaug River on the North Woodstock-Quinnebaug Road; **Osborn-Barnes Company**, Danbury, about 9,362 feet of grading and native gravel surface on the Litchfield Road, Route 128; and to **Arborio Road Construction Company**, Hartford, about 5,500 feet of grading and native gravel surface on the Litchfield Road, Route 128.

New Jersey Notes

An interesting record of shovel service is contained in the books of **Sowerbutt Quarries of Paterson.** The following figures represent the yearly production of their ½ and ¾-yard Bucyrus-Erie steam shovels up to the year 1930 and are furnished through the courtesy of Mr. Vandermade of the Sowerbutt Quarries. At Quarry Number One a Type A ½-yard steamer started in 1919 with production of 32,125 cubic yards, in 1920 the output was 31,670 cubic yards; in 1921, 37,467; and in 1922, 32,493 cubic yards. The following season a Bucyrus-Erie Type B ¾-yard steam shovel took over the main production at this quarry loading out 41,430 cubic yards in 1923. This machine produced 56,246 cubic yards in 1924 and loaded 58,081 cubic yards in 1925; in 1926, 54,157 cubic yards; in 1927, 66,888 cubic yards; in 1928, 73,238 cubic yards and in 1929, 76,939 cubic yards. At Quarry Number Two another Bucyrus-Erie Type A ½-yard loaded out 24,977 cubic yards in 1919, 41,762 in

Economical?

Yes, but that's not the *only* reason why there are more "Loomis Clippers" in use today than any other make.

Made in steel or wood frame or all steel for wire or Manila line.

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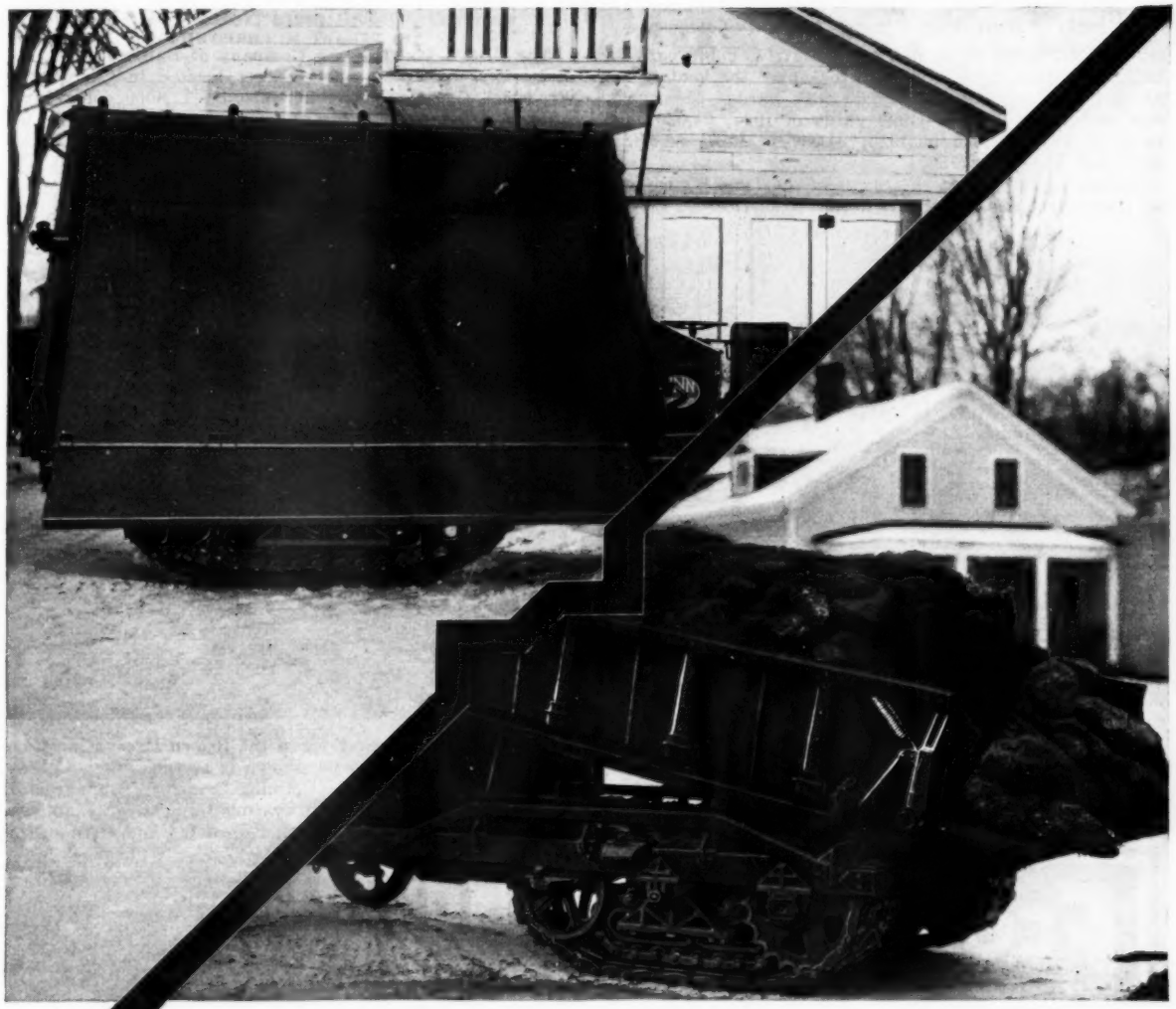

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The NEW LINN Elevating Grader Body (complete specifications on request) saves time and speeds up any job. LINN'S sturdy tail board—another new LINN feature for rear dumping—lifts and locks automatically. These features combined with the wide, ground gripping tracks, made of increasingly durable 12% manganese steel, which maintains full contact with the road surface—mean *transportation plus.*

LINN'S moving anti-friction contained roller chain system, transferring the full weight of the machine and pay load to the ground, spares axle and axle bearing in the rear drive of wear and tear . . . and the dependable 100 h. p. motor is capable of towing 25 to 100 tons, conditions considered.

LINN TRACTORS

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Patent No. 1,521,454
Patent No. 1,685,641
Patent No. 1,685,676
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Exclusive LINN features, all of these, are reasons why LINN completes tough jobs that baffle ordinary machines.

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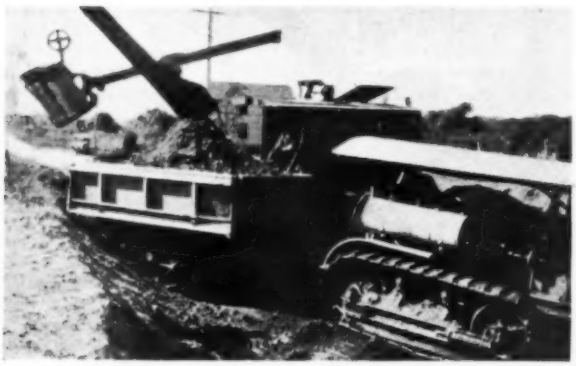
Shots From the Firing Line — *Continued*

1920; 37,231 cubic yards in 1921 and 47,176 cubic yards in 1922. In 1923 a Type B ¾-yard took over the loading and production that year was 55,889 cubic yards. The output was increased to 58,464 cubic yards in 1924; 74,026 cubic yards in 1925; 68,526 in 1926; 81,987 in 1927; 82,676 in 1928; and 74,807 in 1929.

The above illustration shows one of the Type B's referred to, these machines being still in active service.

By M. C. WATERMAN



Operator James A. Cherrey of Ridgefield sends us the above picture showing a Bucyrus-Erie Gas+Air owned by S. J. Groves & Sons of Minneapolis on highway work in New Jersey.

Mr. Cherrey states that as high as 224 8-yard Athey 3-way dump wagons have been loaded in 10 hours with this machine. They were using 9 buckets to the load so that their wagons carried the full 8-yards. Caterpillar tractors were used for hauling. He is very enthusiastic about the Gas+Air machine.

Baltimore Notes

By STUART M. CHRISTHILF

The G. & L. Contracting Company of Baltimore was the low bidder on a 6.4 mile contract located in Carroll and Frederick Counties. This job includes 119,000 cubic yards of excavation quite a bit of which is rock. The low bid amounted to $197,000.00 and there were eighteen bidders on the contract, the highest bid reaching $267,000.00. The Maryland State Roads Commission has allowed 130 working days to complete the entire job.

P. D. Philips and Brother of Salisbury, Maryland, have been returned low bidders on four sections of Maryland road contracts, all concrete jobs, totalling six miles, so far this season. This company is fast developing into a rapid road building organization.

Pennsylvania Notes

Mud and then more mud but the Linns kept right on wading through. This illustration from an unretouched photograph taken in March last year shows actual hauling

conditions on the operations of the **Brown Excavating Company of Hazelton.** The job shown is at the Gowen Colliery of the Buck Mountain Coal Mining Company. Linn tractors are used by the Brown Excavating Company to haul coal from an Osgood shovel on this open pit operation. From

Economy

The Toledo is the *only* torch with the new patented Economy Burner. Kerosene consumption cut in half. No wick consumption.

Order from your dealer. Insist on the genuine Toledo.

THE Toledo Torch

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Insured lubrication is of greatest importance immediately following a period of shut-down. Equipment that has been idle for weeks, perhaps exposed to weather, may be rusty, cables and bearings stiff, wearing surfaces often corroded. Thorough lubrication is necessary to avoid serious damage during the first day of operation.

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Shots From the Firing Line — *Continued*

fall to late spring, P. B. Brown, in charge for the Brown Excavating Company, tells us, hauling conditions were similar to those shown at the time the picture was taken —yet the Linns pulled through without any difficulty with average loads of 7 tons of coal. Sol Jenkins is superintendent of the Gowen Colliery.

Buffalo and Vicinity

By W. R. BEEBE

Charles J. Peters, the son of dirt mover N. D. Peters, Utica, has recently received well deserved recognition in his appointment to the American Consulate in Chile.

Mr. Peters is a former representative of the First District of Oneida County and as one of the youngest Assemblymen was honored with important committee assignments having served on Public Service, and Affairs of Cities and Public Institutions committees which reflects his high regard within the Legislature. The well wishes of the many friends of N. D. Peters will accompany the new vice consul who will shortly be at his post in Santiago.

Ohio Notes

Construction of a $1,000,000 plant, the first unit of an extensive development in Cleveland by the General Electric Co., has been started by the **Austin Company,** engineers and builders of Cleveland. The contract includes all construction and installation of plumbing, and will be completed August 1.

Michigan Notes

Chief Engineer Hoynish of the G. L. D. & D. Company of the Dredge Mogul sends the above picture showing a "big one" which the Dredge Mogul pulled up in St. Mary's River. The rock measures 11x9x7 feet over all. It is one of the big boys that the Mogul encountered in loading blasted rock while widening the main channel of St. Mary's River abont 20 miles east of Sault Ste. Marie. Chief Engineer Hoynish is standing just in front of the big rock.

Indiana Notes

January awards by the Indiana State Highway Commission include: 11.102 miles of concrete on State Road 18 in Blackford and Jay Counties to P. B. Putman of Fort Wayne; 0.199 miles on State Road 7 in Jefferson County to the Indiana Road Paving Company of Rochester; 4.851 miles on State Road 15 in Elkhart County to the Rieth-Riley Construction Company of Goshen; 7.878 miles on State Road 1 in Franklin County to the Globe Construction Company of Evansville; 6.529 miles on State Road 54 in Greene County to the John J. Quinn Company of Bedford and 12.920 miles of grading on State Road 45 in Dubois and Martin Counties to the Foulke Contracting Company of Terre Haute.

Truck-Tractor and Bulldozer

What a Dirt-Mover! What a Time-Saver!

IT'S all body—a broad body that makes possible a big heap — above which it's easy to spot a clamshell and it's low enough for use with conveyor type mechanical loader.

Load is AHEAD of the driver—he *sees* where he's going — drives to dumping point — load quickly dumps out of wide end—and then he bulldozes the pile—the body is low enough in dumping position!

No time-wasting turning on a soft dump; he *backs* out!

Two Motors—Selective Steering

One powerful motor for each multiplane. Simplified construction and either throttle or clutch steering. Full length, broad, strong, special design multiplanes of such low ground pressure that the Dumptor goes where trucks can't go! Koehring *Heavy Duty construction.*

No doubt about the cost-cutting in dirt moving!

Get the full details of this progressive new type of dirt mover which has proved its ability to cut costs on almost every type of job. Write for Special Koehring DUMPTOR circular.

National Equipment Corporation NEC

N. 30th St. & W. Concordia Ave., Milwaukee, Wis.

A 6237-½

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Shots From the Firing Line — *Continued*

Wisconsin Notes

Phil Adler of Ortonville, Minnesota sent us the above snapshot showing the Bucyrus-Erie Type 1035 owned by **A. E. Bonnsall of Kenosha,** operating in a material yard for a paving job at Stevens Point. The machine handles a 1-yard Williams bucket and is equipped with "Yellow Strand" cable manufactured by the McWhite Cable Company of Kenosha. Material was handled to a Butler Bin and 17 trucks were used to haul the aggregate approximately 8 miles to the job. Operator Adler is enthusiastic about the 1035 and tells us that it is the best machine he has ever handled.

In Scotland a dead-end street is a street with a toll bridge at the end of it.

"Should a man propose to a girl on his knees?"
"Either that or she should get off.".

Minnesota Notes

By H. L. JONES

Griffis Brothers, Minneapolis, moved 275,000 yards of material during the season of 1930 with the above outfit. The shovel, a Bucyrus-Erie B-2, is equipped with a 1¼-yard dipper. Western and Athey wagons, hauled by Caterpillar tractors, were used. Night shift was worked only part of the time. The season's work was on two jobs, one at Lake City on Highway 3 and one at Grand Rapids on Highway 8. This snapshot was furnished through the courtesy of William H. Ziegler Company, Inc.

Saint Louis and Vicinity

By A. J. KOENIG

Contracts have been let on three St. Louis County highway projects aggregating $179,352. They include: **Cream & Scott Construction Company**—low on the Halls Ferry Road project involving 5,759 feet of 20 ft. concrete slab at $38,329. **Bangert Brothers Construction Company**—low bidder on the Aubuchon Road project a distance of 14,082 feet, at $125,897. This same company was low bidder on the Accommodation Road cut-off, entailing 3,030 feet of paving at $15,216.

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We'll be glad to help you estimate the improvement you can reasonably expect on your excavating or material handling, with a *Williams* "Champion" Bucket. *Let one prove itself on your work.* Write us.

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291

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The Ferguson Construction Company of Rockford, Illinois was low bidder for the construction of a bridge across the Wabash River at Vincennes, Indiana at a price of $257,195.

The Illinois State Highway Commission received bids for 110 miles of paving and 24 miles of grading. Twenty-nine projects are involved in this letting, all to be completed by September first.

Cameron, Joyce & Company of Keokuk was low bidder on four paving projects involving 18.16 miles at $279,937. Also 3.07 miles of grading on Route 120 in Piatt County at $28,201.

Lefferdink Construction Company of Lincoln, Illinois was low on two paving projects on Route 120; entailing 8.81 miles at $106,558.

Work on the Missouri River, between St. Joseph, Missouri and the Mississippi River, has sped up within the past month. At the present time eighteen projects have been started. Among the contractors with outfits on the river are **Massman Construction Company**, Kansas City; **Bilhorn, Bowers & Peters**, St. Louis; **C. H. Hunter Construction Company**, Memphis; **List & Weatherly**, Kansas City and **Woods Bros. Construction Company**, Lincoln, Nebraska.

The Missouri Pacific R. R. Company awarded the contract for grading and culvert construction in revising 30 miles of grade between Delavan and Gypsum, Kansas to **List Construction Company**, Kansas City. **The Industrial Construction Company** of St. Louis was awarded the bridge work.

A. W. Farney, Kansas City was awarded contract for 5,400 feet of standard revetment and 10,400 lineal feet standard pile clump dike on the Missouri River near St. Joseph.

W. E. Callahan Construction Company, St. Louis, was awarded contract for the construction of section "J" River Des Peres Drainage Works. This will be an open ditch 2½ miles long with 125 feet bottom.

Kansas City Bridge Co., Kansas City, was low bidder on 8,970 lineal feet of standard pile clump dike on the Missouri River at Murray's Bend, near Jefferson City.

M. N. Penny, Lawrence, Kansas was low bidder on 16.77 miles of 10 feet concrete paving in Atchison County, Mo.

Davis Construction Company, Boonville, Missouri was low bidder on 19 miles of 10 feet concrete paving in Lafayett and Saline Counties, Missouri.

Knutson Brothers, Kansas City was low bidder on 10.94 miles of grading in Adair and Sullivan Counties entailing 250,000 cubic yards of earth and 25,000 cubic yards of rock.

Cleveland Contractors, C. R. Cummins, Inc., were recently awarded a Government levee contract, involving 1,800,000 cubic yards, near Eldred, Illinois. A Bucyrus-Erie Class 320 steam dragline has been installed on this work. The amount of the contract is $225,000.

Tommy: "Why do you suppose Adam was created first?"

Dad: "Oh, perhaps to give him a chance to say something."

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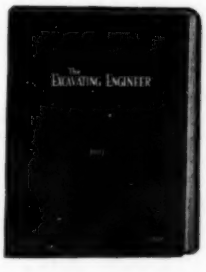

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1831

1931

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Shots From the Firing Line — *Continued*

Missouri Notes

By H. E. SNIPE

At Waynesville, A. A. Davis is using the outfit shown above to supply aggregates for his job on U. S. Highway 66. The Bucyrus-Erie 1030 uses a 40-foot boom and ¾-yard Owen clamshell bucket.

Kansas City Notes

The recent death of Walter S. Dickey of Kansas City, Missouri, head of the W. S. Dickey Clay Company, was commemorated by the United States Chamber of Commerce with resolutions of sorrow by their Board of Directors. Mr. Dickey served actively for many years as a member of Chamber Committees.

We Faintly Remember

Bim: "Her father kept a saloon."
Bo: "Is her family as old as that?"

Southern Notes

By J. S. MOSHER

B. E. Brooks of Brooks-Callaway Company, Atlanta, called at our office this week and advised that the month of January, their first operating month with the Bucyrus-Erie 230 Diesel-electric, caterpillar mounted dragline, showed very good results. They are spending the greater portion of their time building levees on the Arkansas River.

H. E. Wolfe Construction Company have moved to their new job near Springfield, South Carolina.

Hardaway Contracting Company of Columbus, Georgia, were able to make much progress on their grading out of Conway, South Carolina, during the good weather of early February.

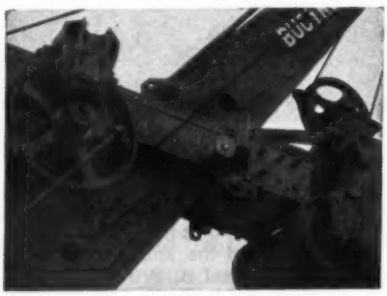
Texas Notes

By G. A. CARLSON

The above illustration shows Gifford-Hill and Company, Inc. 50-B steam pile driver at work on the Dallas Power and Light Company's Dam near Dallas. **Gifford-Hill and Company, Inc.** are driving all of the sheet steel and timber

Seconds Count . . .

and a power dipper trip will save **seconds** in each digging cycle.



In this day when buyers measure the digging cycle in SECONDS before purchasing, consider the added output of your shovel after a Bucyrus-Erie power dipper trip has been installed.

Always positive in action, giving trouble-free service, a Bucyrus-Erie power dipper trip will soon pay for itself—and then add profits to the day's work.

For your steam, Diesel or electric shovel — write to **Bucyrus-Erie Company, Specialty Department, South Milwaukee, Wisconsin,** for complete information and prices.

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Shots From the Firing Line — *Continued*

piling for spillway foundation on this project. **W. E. Callahan Construction Company** have the contract for the dirt work which involves approximately 570,000 cubic yards of earth fill in sprinkled and rolled embankment. **Peterson, Shirley and Gunther** are handling the dirt work for W. E. Callahan Company. **Texas Construction Company** are doing all the concrete work, and are using Penniman Transit-Mix Concrete. The Transit-Mix trucks are loaded from a special batcher plant erected near the dam site. Gifford-Hill and Company, Inc. are furnishing the gravel from their nearby pit.

John Hershey, Engineer for Peterson, Shirley and Gunther, is at Lakeside superintending the dirt moving, and has Leech Brothers supervising the shovel operation.

Colorado Notes

By W. A. MURRAY

Edward Selander of Greeley, Colorado, uses his Bucyrus-Erie to load sugar beets, as shown above. The machine is equipped with a 1½-yard dipper.

San Francisco and Vicinity

By J. H. SACKETT

Plans and specifications are being completed by County Engineer, E. Ball, Court House, Napa, Napa County, and County Surveyor, E. A. Peugh, Court House, Santa Rosa, Sonoma County and call for bids will be issued shortly by the Joint Highway District No. 7, care Board of Supervisors, Court House, Napa, Napa County for the grading of 6 miles of highway through Knights Canyon. Work involves 150,000 cubic yards roadway excavation.

Plans and specifications are being prepared by the **Bureau of Public Roads**, Sheldon Building, 461 Market Street, San Francisco for the construction of the following projects:

Grading of 6.2 miles of the Ventura-Maricopa Highway in Ventura County from Ortega to Matilija Springs to cost $565,000. Bids for this project will be called for within the next two weeks.

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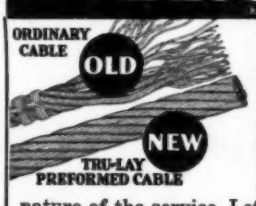

Wires and strands are preformed — shaped to the exact helical form they assume in the finished structure. Preforming removes internal stress, resulting in 30% to 300% increased service, depending on the character of the equipment and the nature of the service. Let us give you the facts. Address:

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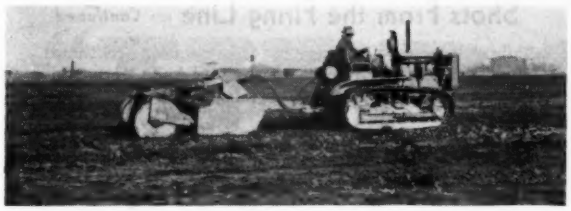

W. K. McMillan, San Francisco contractor, recently hooked up his Caterpillar "30" and Ateco Dirtmover on the San Francisco Bay Airport job in Alameda.

The field was constructed on fill material dredged from the Bay and it was necessary to sub-soil about two feet deep so it would dry before grading. Two Dirtmover outfits handled the entire job — one (shown above) was owned by Contractor McMillan, and the other by the airport. The new landing field will have a runway, with a crown of 18 inches, 3,400 feet long by 500 feet wide.

Bids on the following projects will be called for within the next month or two:

Modoc County—Grading Lava Beds project, 10.9 miles, estimated cost $100,000.
Modoc County—Grading the Howard Gulch project 9.6 miles, estimated cost $110,000.
Grading Oak Creek, Upper Canyon Section in Arizona, 2.9 miles to cost $23,000.
Arizona-Oiling South Approach road in the Grand Canyon, 35 miles to cost $250,000.
Lassen Park—Surfacing and oiling, 30 miles Loop Route, $170,000.00.

Plans being made by Bureau of Public Roads, 461 Market St., San Francisco, and call for bids will be issued within the next two or three months for the construction of the following projects:

Buckeye's ⅜-Yard Utility Unit Offers Dependable Earning Power *Plus*

Over thirty years of successful engineering have proved the soundness of Buckeye's design and construction. The same period of time has definitely established their reputation for delivering profitable performance continuously.

Into ⅜-yard full revolving Model O is built this dependability—earning power—which has always distinguished Buckeyes. It offers even more—Crane, Clamshell, Dragline or Backfiller, all as required in a day's operation. This unit now provides a greater range of usefulness than ever before available in any equipment of its class —*at its price.*

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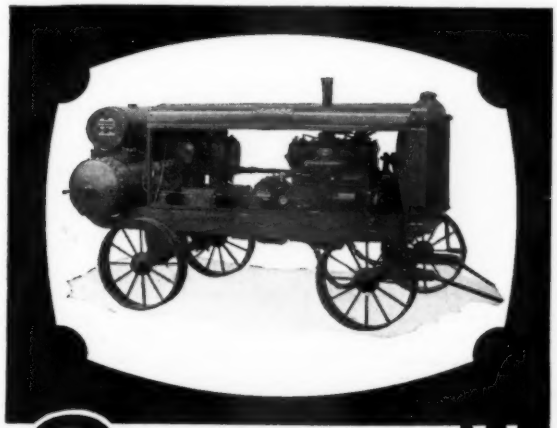

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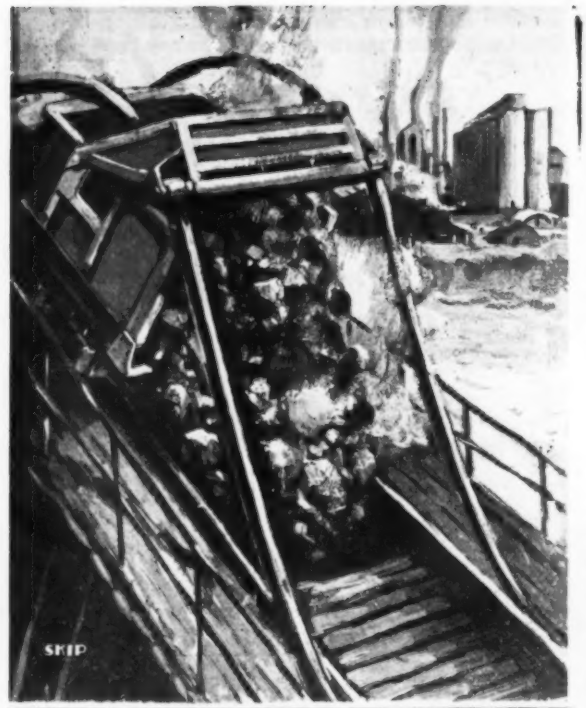

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Hayward Buckets

Shots From the Firing Line — *Continued*

Tulare County-Grading in the Sequoia National Forest on the Generals Highway, Ash Mountain-Hospital Rock Section, estimated cost of work $150,000.
Grading and Bridge, Petrified Forest National Monument Sect. Arizona, $300,000.

By G. C. RASEY

Dropped around the other night to see Night Operator O'Neil who is pulling the levers on the **Lewis Construction Company's** Bucyrus-Erie 52-B dragline on their grading job for the Western Pacific near Westwood, California. The machine is out in the midst of an old lake bottom covered

with a solid mass of huge volcanic boulders and the working area was brilliantly illuminated by the lights on the machine operating off one of the Kohler light plants.

"How's everything?" I asked.

"Okey except that you've got to slow down this rig for night work," says O'Neil.

"What for?" I inquired.

"Well its too blame dangerous. Just a little while ago as I was working along I heard a heck of a racket. I craned my neck all around and what did I see but a big tri-motor plane nosing down and getting ready to land on me. He saw that bright flood light on the end of the boom swinging back and forth and thought it was an airport beacon. I snapped off the lights quick and he went on but if I hadn't he'd have made a pancake out o' me."

Washington Notes

C. J. Erickson of Seattle was recently awarded contract for clearing, grading and draining about 1.3 miles of State Road No. 12, Niawiakum River to Palix River, Federal Aid Project No. 178-B, in Pacific County, involving about 16 acres of clearing, 59,480 cubic yards of excavation, 1,180 lineal feet of pipe culverts and other items.

Erickson Paving Company of Seattle was awarded at the same letting the filling in of a portion of Block 272, Seattle Tide Lands located at the northwest corner of Sixth Avenue South and Spokane Street, involving about 17,180 cubic yards of excavation.

Beauty Discovered

Foreman (roaring with rage at Cookee): Who told you to put those flowers on the table?

Cookee: The Superintendent, sir.

Foreman: Pretty, aren't they?

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"HERCULES" is an economical wire rope because it possesses in proper balance and to a correct degree, all of the qualities that hard work requires.

Another big advantage of this wire rope is that it is made in the Patent Flattened Strand constructions as well as in the standard Round Strand constructions. There is a right construction of "HERCULES" (Red-Strand) Wire Rope for every type of wire rope using machine.

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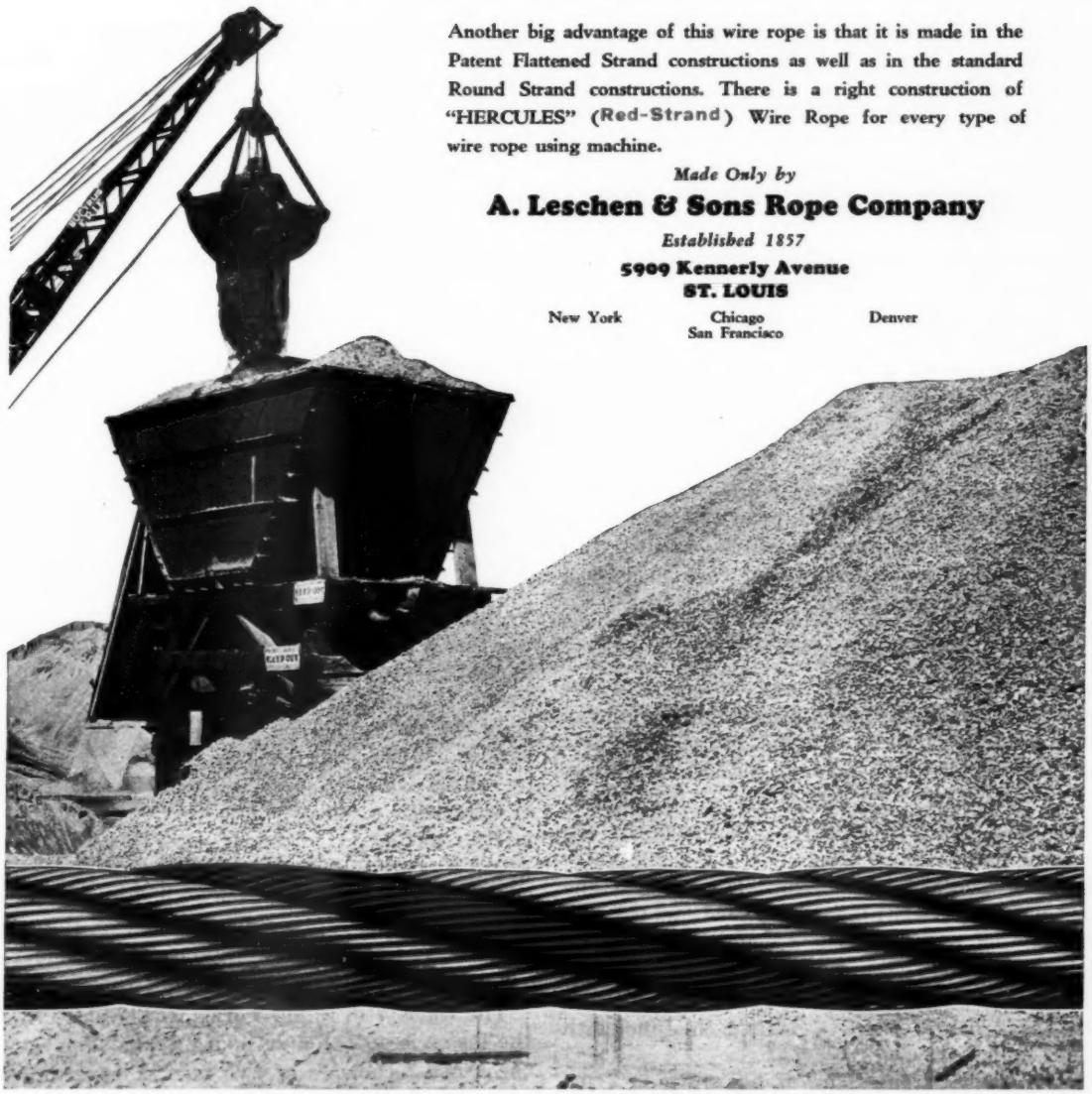

In writing to A. Leschen & Sons Rope Co. please use post card bound in the center of this number.

Taming "Old Man River"— Yesterday and Today

(Continued from Page 116)

ates at the land side of the levee, the tail tower on the river side of the borrow pit. The bucket, hanging from a trolley on the cableway between the towers, is dropped and filled in the borrow pit, pulled and raised to proper position over the levee and dumped. By dragging it up the slope of the levee the surface of either slope may be smoothed close to the finished grade. The Clarke Brothers' machine is a TX-300, the head tower operated on trucks and rail sections moved by a special carrying device, while the self-propelled tail tower is on caterpillar type mountings.

The head tower of the Clarke Brothers' machine measures 120 feet from the ground to the top of the track cable sheave in high position and weighs about 415,000 pounds. The tail tower weighs approximately 181,000 pounds and carries the 1⅜ inch track cable at a height of 30 feet. The machine uses a 10-yard Bucyrus-Erie special tower excavator bucket and is rated to handle a 630-foot operating span, though this has been exceeded successfully by the owners. Broderick & Bascom Yellow Strand wire rope is used.

The track cable sheave on the head tower may be raised or lowered as required between 100 and 120 feet. The drag cable sheave may also be varied from a height of 45 to one of 65 feet. The operators' cab is located on the tower 60 feet from the ground.

Power for the digging operations is supplied by General Electric motors with Ward-Leonard control. There are also 4-cylinder, 80-horsepower Wisconsin gasoline motors on both head and tail towers for moving. Digging operations are handled with air controls, compressed air being furnished by a motor-driven air compressor.

175,000 Cubic Yards Averaged Per Month

Clarke Brothers started their tower excavator on their section Birds Point—New Madrid spillway levee on April 1st, 1930. To the 1st of February, 1931 the machine had been in continuous operation, with exception of short delays for cable changes, adjustments and repairs, a total of 9 months. In this time the machine has moved 1,600,000 cubic yards, an average of 175,000 yards per month. The record output was 231,000 cubic yards in October when the dirt was in excellent condition to handle and averaged 5,000 cubic yards to the station. This record was closely approached in August with an output of 220,000 cubic yards and in June with 200,000 cubic yards.

At the present time they are operating on a 700 foot span using a back haul line during the day shift, but with no back haul at night when the operator does not attempt to reach the far side of the borrow pit. The levee is now running 8,000 yards to the station and the daily production runs about 4,500 cubic yards.

Complete Cycle in 1 Minute 12 Seconds

On spans of 500 to 600 feet they average 7000 to 7500 cubic yards per day. An extensive time study made when they were operating on about 450 to 470 foot spans shows a complete cycle in 1 minute 12 seconds.

The levee, as we have said, has an average height of 16.5 feet. The land side has a slope of 5½ to one, the river side, 3½ to one, while the flat crown is 10 feet wide. There is a 40 foot berm between levee and borrow pit, the latter dropping on a two to one slope for a depth of three feet and then extending to its limit at a 50 to one slope.

Such finishing as is required after smoothing with the tower bucket is by one to three teams using fresnos and harrows. There is also a Fordson tractor on the job used for general utility purposes, and to pull the track sections of the tower excavator ahead on the overhead mono-rail as needed.

Stationary Diesels Generate Power for Operation

The power house which furnishes the electricity for the job is located on the railroad siding about two miles back from the levee in approximately the center of the job. This makes it convenient for fuel oil deliveries in tank car lots. The two Busch-Sulzer 400 B.H.P. Diesels are directly connected to 270 K.W., 4,400 Volt, 3 phase, 60 cycle, Westinghouse generators. From the power plant the current is carried to the job by three strands of wire with 4,400 volts capacity. About five miles of wire has been erected to reach all parts of the job. Engineer L. A. Shiland has charge of the power plant and has a day and night engineer under his supervision.

Looking across the borrow pit from the top of the tail tower.

The Class 7 dragline works 10 hours a day but the tower is operated 24 hours a day. The crew of the Class 7 consists of two men, an operator and oiler. The crew of the tower machine consists of a

(Continued on Page 152)

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Space under this heading is available at $5.50 per inch or fraction thereof.

Address all box numbers c/o The Excavating Engineer at South Milwaukee, Wisconsin

DRAGLINE AND SHOVEL OPERATOR

25 years' experience on Bucyrus-Erie, Thew Osgood and Marion shovels and draglines, steam and electric powered. Have worked on highway and railroad grading, drainage and irrigation with draglines and dredges. Experienced in iron ore, coal and phosphate mining. Can do own repairing. Prefer operating Bucyrus-Erie machine. Can furnish reliable references. Present location, Tennessee. Box 1204.

DRAGLINE-SHOVEL OPERATOR

12 years' experience on Bucyrus-Erie Gas+Air, electric, Diesel and steam machines on levee and drainage work. Prefer operating Diesel machine anywhere. Can make own repairs and furnish good references. Present location, Arkansas, Box 1212.

SHOVEL OPERATOR

14 years' experience on steam and gasoline—Marion, Northwest and Thew shovels, draglines and cranes in highway, railroad grading and quarries. Prefer Northwest or Bucyrus-Erie anywhere in United States or Canada. Can do own repair work and all overhauling. Single and sober. Box 1206.

CLAMSHELL-DRAGLINE-SHOVEL OPERATOR

10 years' experience on Gas+Air, electric and steam machines on highway, general excavating and materials handling. Will consider operating work anywhere in country. Own repair man and can furnish reliable references. Present location, Pennsylvania. Box 1213.

DRAGLINE-SHOVEL OPERATOR

25 years' experience on Bucyrus-Erie, Monighan, Thew and Marion machines on drainage, levee, canal and highway excavating. Will go anywhere in U. S. A. Can do own repairing and furnish good references. Present location, Missouri. Box 1214.

DRAGLINE-CLAMSHELL-SHOVEL OPERATOR

Experience covers years on steam, electric, gas, and Gas+Air machines on highway and canal work. Willing to go anywhere in United States. Own repairman. A-1 references. Present location, Pennsylvania. Box 1209.

SHOVEL OPERATOR

Experienced on Bucyrus-Erie Gas+Air shovels on highway grading. Willing to go anywhere in U. S. A. Can do own repair work. Reliable references furnished. Present location West Virginia. Box 1210.

CLAMSHELL-SHOVEL OPERATOR

Have operated gasoline and steam machines on highway and sewer excavation. Prefer operating work in Eastern United States. Can do own repair work and furnish excellent references. Present location, New Jersey. Box 1211.

CRANE-SHOVEL OPERATOR

10 years' experience on Bucyrus-Erie and Lorain steam machines on railroad, highway, quarry and basement excavation, steel hoisting and pile driving. Can do own repairing and furnish excellent references. Present location, New York. Box 1205.

DRAGLINE-SHOVEL OPERATOR

Experienced on Bucyrus-Erie 50-B electric, 50-B Diesel and Marion 37 on all types of shovel and dragline excavating. Will go anywhere in U. S. A. Can do own repairing and furnish A-1 references. Present location, Illinois. Box 1207.

DRAGLINE-CLAMSHELL-SHOVEL OPERATOR

Have operated large and small Bucyrus-Erie gasoline and steam machines on drainage, grading and levee work. Willing to go anywhere in U. S. A. Can make own repairs. Good references. Present location, Mississippi. Box 1208.

DRAGLINE-SHOVEL OPERATOR

Levee, drainage and road building experience covering 23 years on electric, Diesel, gas and steam machines. Willing to go anywhere in United States. Can do own repair work and furnish A-1 references. Present location, Arkansas. Box 1201.

FIRST CLASS MECHANIC

18 years' in machinist and tool-making field including foreign experience. Prefer foreign work. Can furnish reliable references. Single. Present location, Pennsylvania. Box 1202.

SHOVEL OPERATOR

Experienced on Erie, Koehring and Thew gas and steam machines on highway and grading work. Will go anywhere in U. S. A. Can do own repairing. Excellent references furnished. Located in Alabama. Box 1203.

SHOVEL OPERATOR

5 years' experience on Erie steam shovels on construction work. Will go anywhere. Can do own repair work. Reliable references furnished. Present location, Alabama. Box 1215.

DRAGLINE OPERATOR

25 years' experience on steam draglines on construction work. Prefer operating dragline. Can do own repair work. Reliable references furnished. Present location, Indiana. Box 1216.

SHOVEL OPERATOR

10 years' experience on Bucyrus-Erie steam and gas dragline and clamshell on road and street, cellar and general grading work. Prefer operating shovel or clamshell. Will go anywhere. Can do own repair work. A-1 references furnished. Present location, Indiana. Box 1217.

SHOVEL AND CLAMSHELL OPERATOR

12 years' experience on Bucyrus-Erie, Marion, Thew and Osgood shovels, steam and Gas+Air powered. Experienced in all kinds of shovel work—canal, quarry, railroad, street and highway. Can produce A-1 yardage and do own repair work. Reliable references furnished. Will go anywhere in U. S. on short notice. Present location, Ohio. Box 1218.

EXPERT DRAGLINE AND SHOVEL OPERATOR

16 years' experience as shovel operator. Married, 36 years of age. Have operated practically all makes of machines, and have 10 years' experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie Diesel, E-2, D-2 or 50-B or other Bucyrus-Erie machines. Capable of taking charge of repairing and erecting and can handle crews. Best of references and can do own repairing. At present located in California but will go anywhere. Box 1219.

OPERATOR AND SHOVEL REPAIRMAN

Have been foreman in charge of repairing shovels for four years and have operated 50-B Bucyrus-Erie steamer for five years. Recently finished up on large dam job in Vermont. Can furnish best of references and will go anywhere in the U.S.A. Present location Vermont. Box 1223.

SHOVEL OPERATOR

12 years' experience on various types of shovels both electric and steam. Can do own repair work and furnish best of references. Age 34. Permanent quarry work preferred. Present location Illinois. Box 1220.

MASTER MECHANIC

Experienced on excavating machinery, steam, Diesel, gasoline and electric and also on allied contracting equipment and shop work. Married. Can furnish good references. Present location Milwaukee. Box 1221.

SHOVEL OPERATOR

8 years' experience on gasoline shovels working on street, highway and dam construction. Will accept position on Northwest, Link-Belt, Thew or any new gas shovels. Will go anywhere in U. S. A. or countries in South America. Married and 33 years of age. Can do own repair work and furnish best of references. Located in Louisiana. Box 1222.

SHOVEL OPERATOR

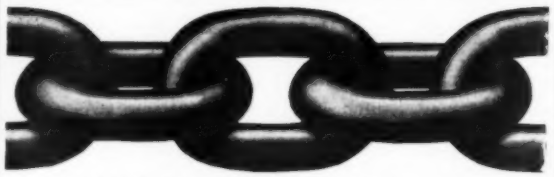
12 years' experience on steam and gasoline machines on levee and drainage work. Prefers to operate steam machines, but will go on any type. 37 years of age and married. Can do light repair work and furnish good references. Location at present, Indiana. Box 1224.

SHOVEL OPERATOR

9 years' experience on Diesel Draglines on drainage and road work. Prefers position on Bucyrus-Erie Dragline, E-2, or D-2 machine of ¾ or 1 yard capacity. 36 years of age and single. Would like position in Middle West. Can do own repair work and furnish best of references. Location at present, Iowa. Box 1225.

SHOVEL, DRAGLINE AND CLAMSHELL OPERATOR

5 years' experience on shovel, dragline and clamshell on ditch, quarry and railroad work. Fired steam for four years, can also operate Diesel machine. Prefer position on shovel or dragline on any make of machine, power or size. Age 24 and married. Can do own repair work and furnish good references. Present location Missouri. Box 1226.



A SHOVEL CHAIN with varying links causes excess wear of both chain and sheaves which prevents smooth operation, slows down speed and finally results in a costly shut-down for installation of new sheaves and chain.

NACO Shovel Chain, because every link is exactly alike in size and shape, reduces this wear to a minimum, runs smoothly, speeds up operation and keeps the shovel working with little time lost for repairs.

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NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

General Office—CLEVELAND, O.

(Continued from Page 150)

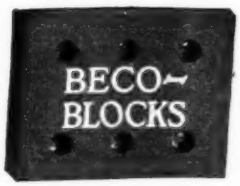
tail tower operator. There is also a small gang of laborers used with the team gang for dressing the levee slopes.

T. J. Clarke has his field office at Anniston, Missouri and personally directs the entire job. Superintendent Ralph Harlan is in direct charge and keeps things moving both night and day. The tower operators are Joe McAlester, Jess Austin, and Ben Woods. The Class 7 dragline is operated by Fred Okeever.

T. T. Knappen is U. S. Area Engineer in charge of the district with office at Cairo, Illinois. Government Inspectors William Steel, E. F. Tippetts and Joe Gowan have direct supervision of the work for the government.

Clarke Brothers Also Excavating Another 2,000,000 Yards on Drainage System

At this writing Clarke Brothers have just started another job consisting of 2,000,000 cubic yards of excavation for drainage in connection with the Birds Point—New Madrid Spillway Levee. This work is necessary because the new levee crosses the old drainage works and renders the present system useless. On this job they are using two Bucyrus-Erie Class 14 Diesel-electric and one Bucyrus-Erie D-2 Diesel draglines. Jess Tucker and Carl Jenson have charge of the Class 14's and Jess Hensley captains the D-2.



In modern excavating machinery heavier loads and increased speeds require improved friction surfaces. BECO-BLOCKS have been developed to meet this need and we recommend them as the most serviceable friction materials to be had.

With BECO-BLOCKS it is possible to start your machinery gradually and without shocks; to slow down quickly or slowly as you desire; to be sure of positive friction or braking action and to rely upon continuous operation.

The durability of BECO-BLOCKS is many times greater than Wood or inferior friction materials. Use BECO-BLOCKS and eliminate many shutdowns for adjustments and replacements.

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